MUKILTEO MULTIMODAL PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

Transportation
Discipline Report

Prepared for:

U.S. Department of Transportation
Federal Transit Administration

Washington State
Department of Transportation

Washington State Ferries

June 2013

Transportation
Discipline Report

Mukilteo Multimodal Project
Final Environmental Impact Statement

Prepared by:

Ryan Abbotts, Parametrix
John Perlic, Parametrix

For:

Federal Transit Administration and
Washington State Department of Transportation

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Acronyms and Abbreviations

ADA	Americans with Disabilities Act
BAT	business access and transit
BRT	Bus Rapid Transit
coll/MVM	collisions per million vehicle miles
DART	Dial-A-Ride Transportation
EIS	Environmental Impact Statement
GMA	Growth Management Act
HCM	Highway Capacity Manual
HOV	high-occupancy vehicle
I-5	Interstate 5
LOS	level of service
mph	miles per hour
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
PDO	property damage only
PSRC	Puget Sound Regional Council
SEPA	State Environmental Policy Act
SR	State Route
TDR	Transportation Discipline Report
TRB	Transportation Research Board
WSDOT	Washington State Department of Transportation
WSF	Washington State Ferries

1 INTRODUCTION

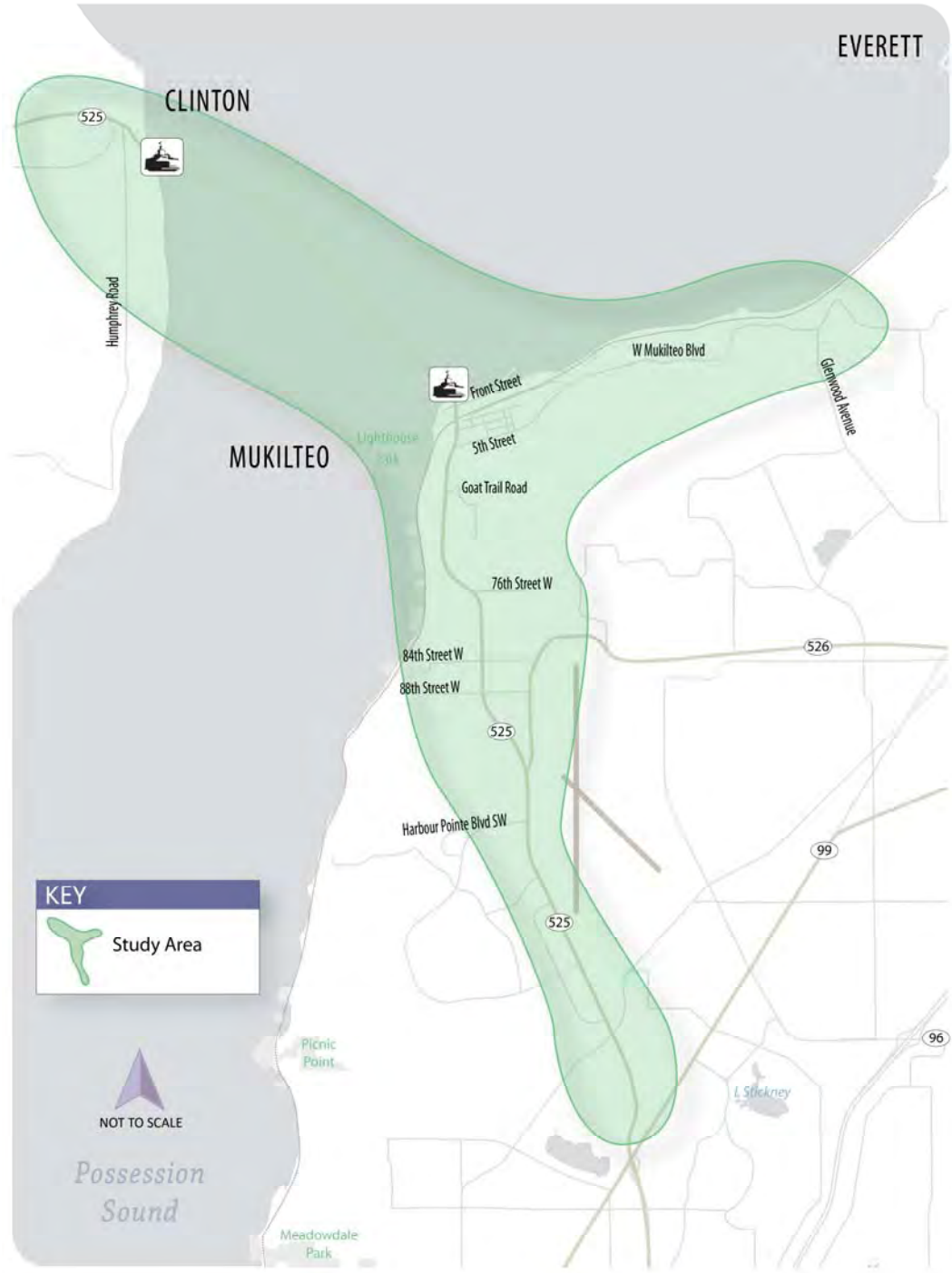
1.1 PROJECT BACKGROUND

The Washington State Ferries (WSF) intends to improve the Mukilteo ferry terminal. This project is known as the Mukilteo Multimodal Project. The Mukilteo ferry terminal has not had significant improvements since the early 1980s, and components of the facility are aging. The current terminal layout makes it difficult for passengers to get in and out of the terminal, which contributes to traffic congestion, safety concerns, and conflicts between vehicle and pedestrian traffic.

As part of the federal regulations and guidelines leading to funding for terminal improvements, WSF is preparing an Environmental Impact Statement (EIS), which will support the evaluation of several options for addressing multimodal connectivity, congestion, and safety at the terminal. As a result of transportation analyses, input received from stakeholders, and comments received, options for relocating the terminal to Edmonds or Everett were not recommended for more detailed evaluation in the EIS; only alternatives in Mukilteo are being considered for the location of the ferry terminal. Because the ferry connects Mukilteo and Clinton, the transportation network supporting these two terminals is described in Chapter 2 of this report.

Exhibit 1-1 shows the study area, which includes the State Route (SR) 525 corridor and the Mukilteo ferry terminal area.

Exhibit 1-1. Mukilteo Multimodal Project Study Area



1.2 PURPOSE OF THE TRANSPORTATION DISCIPLINE REPORT

The purpose of the Mukilteo Multimodal Project is to improve the operations and facilities serving the eastern terminus of the Mukilteo-Clinton ferry route.

This *Transportation Discipline Report* (TDR) is divided into six chapters as follows:

Chapter 1 provides a brief introduction to the project and describes the analysis and regulatory context for the TDR.

Chapter 2 summarizes the existing transportation conditions in the study area for the Mukilteo Multimodal Project. It describes the transportation characteristics in the study area and discusses the multimodal connections occurring at the ferry terminal. It also describes current traffic conditions, including ferry, bus, and rail ridership; vehicle and non-motorized volumes; intersection and ferry levels of service (LOS); and safety.

Chapter 3 describes the alternatives analyzed and reports the operational impacts associated with each alternative. The impact analysis considers long-term changes in ferry operations, the roadway network, non-motorized systems, public transportation, parking, and freight.

Chapter 4 describes the long-term construction impacts associated with each alternative. The characteristics of the construction impacts are described with respect to limiting and closing access to the Mukilteo ferry terminal, construction timing, types of activities, and the duration of construction.

Chapter 5 describes indirect and secondary impacts such as base land use assumptions and consistency with Washington State Growth Management Act (GMA) plans.

Chapter 6 identifies planned projects in the vicinity of the Mukilteo ferry terminal that, when combined with the impacts of the Mukilteo Multimodal Project, could contribute to cumulative impacts.

Chapter 7 proposes mitigation activities to reduce the operational impacts of the Mukilteo ferry terminal alternatives.

Chapter 8 proposes construction mitigation measures to reduce the impacts of constructing the Mukilteo ferry terminal alternatives.

Chapter 9 provides references used in developing this *Transportation Discipline Report*.

1.3 OVERVIEW OF ANALYSIS AND REGULATORY CONTEXT

This section provides a brief overview of the analysis methodology and regulatory context. The analysis of local traffic impacts was guided by the policy direction established in the numerous plans or policy documents adopted for the

Mukilteo/Everett area. These include, but are not limited to the Puget Sound Regional Council (PSRC) *Transportation 2040* Plan; *Comprehensive Plans* for the cities of Mukilteo and Everett, the *6-Year Transportation Improvement Program* for the cities of Mukilteo and Everett, and Community Transit's *Long-Range Transit Plan*.

The transportation analysis uses a variety of technical tools and approaches to evaluate transportation performance across all modes. This evaluation includes forecasts of future travel by mode, as well as travel times and delays, including intersection delays. Travel forecasts are an estimation of how many people will travel in a future year and how those people will choose to travel. The process for developing travel forecasts is described in Chapter 3.

2 AFFECTED ENVIRONMENT

This section summarizes existing transportation characteristics within the study area corridor along SR 525 and at the Mukilteo ferry terminal. It describes the existing road and non-motorized network, traffic volumes, bus and rail operations, parking, ferry terminal operations and scheduling, ferry ridership, multimodal connections, and freight operations. This section also includes an assessment of existing roadway and sidewalk network performance.

2.1 MUKILTEO FERRY TERMINAL FACILITY

WSF operates ferry service connecting Mukilteo to Clinton, on Whidbey Island, as part of SR 525. The Mukilteo ferry terminal is located where SR 525 meets Puget Sound along the northern boundary of the city of Mukilteo. The Mukilteo ferry terminal is a multimodal facility with connections to bus, commuter rail, parking facilities, SR 525, and local businesses.

2.1.1 Sailings and Scheduling

Ferry service operates weekdays from 4:40 AM to 1:00 AM and weekends from 5:30 AM to 1:05 AM. Sailing time between Mukilteo and Clinton is approximately 15 minutes. Unloading and loading times vary by number of passengers and vehicles. Vessel headways are approximately every 30 minutes (two sailings per hour) on weekdays from 4:40 AM to 9:30 PM; all other sailing times have 60-minute headways. For a summary of how ferry schedules align with transit service schedules, refer to *Section 2.4.3*. Service is provided by two ferries, the Kittitas and Cathlamet; both are Issaquah 124 Class ferries built in 1980 and 1981, respectively.

2.1.2 Ridership

Two ferry vessels operate at a time on the Mukilteo-Clinton route. Each vessel has the capacity to carry up to 1,200 walk-on passengers and 124 vehicles on average. The number of vehicles permitted on the ferry depends on the size of the vehicles on the ferry as well as how closely they are parked to one another; therefore, vessels could have slightly more or less than 124 vehicles per sailing.

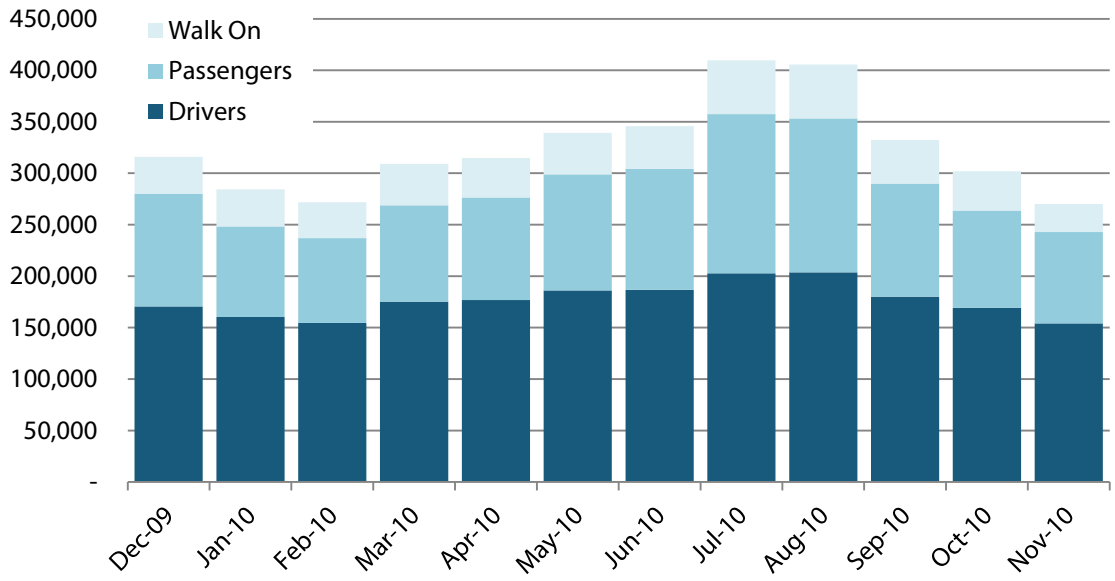
In 2012, the Mukilteo-Clinton route had the system's highest annual vehicle trips (2,090,400; down 1.3 percent from 2010) and the third-highest passenger ridership (1,744,500; down 1.3 percent from 2010). The total annual ridership (vehicles, vehicle passengers, and walk-on passengers) on the Mukilteo-Clinton route (3,835,000) is second behind the Seattle-Bainbridge Island (6,118,500).

2.1.3 Monthly Ridership Variation

Ferry ridership on the Mukilteo-Clinton route fluctuates throughout the year, with the highest ridership during July and August and the lowest ridership in November, January, and February. Exhibit 2-1 summarizes monthly ridership counts on the Mukilteo-Clinton route from December 2009 through November 2010, indicating vehicle driver, vehicle passenger, and walk-on passenger volumes.

The typical or average month for ferry ridership is May, which is consistent with the *WSDOT Ferries Division Final Long-Range Plan* and travel demand model. For planning purposes in the evaluation of existing and future conditions, the average monthly data are used, which is May.

Exhibit 2-1. Monthly Mukilteo-Clinton Ferry Ridership Volumes (December 2009 to November 2010)

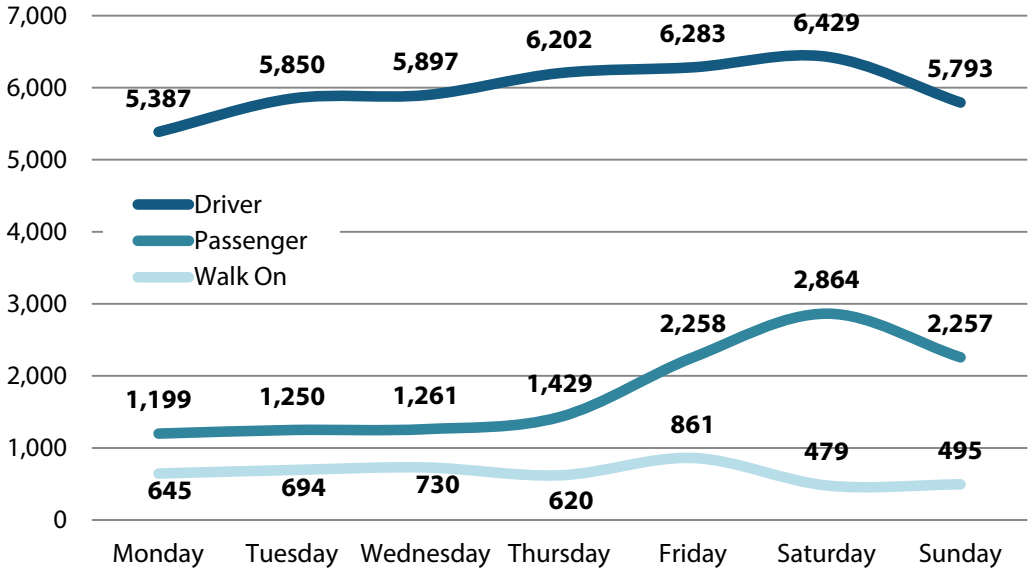


Source: WSF Fare Box Receipts

2.1.4 Daily Ridership Variation

Ridership varies only slightly throughout the week (Tuesday through Thursday) and generally increases during the weekend (Friday through Saturday); Sunday and Monday ridership varies. However, walk-on ridership decreases on weekends while vehicle volumes increase, primarily because there are fewer commute trips and more recreational trips on weekends. Exhibit 2-2 summarizes the average daily ridership for May 2010 recorded for all trips, southbound and northbound, for the Mukilteo-Clinton ferry route. The increase in driver and passenger ridership on weekends represents the addition of recreational and tourist travel. The decrease in walk-on passengers during Saturday and Sunday is because of the reduction in commuter-related trips using bus and commuter rail transit to travel after riding the ferry.

Exhibit 2-2. May 2010 Average Daily Ridership (Mukilteo-Clinton)



Source: WSF Fare Box Receipts

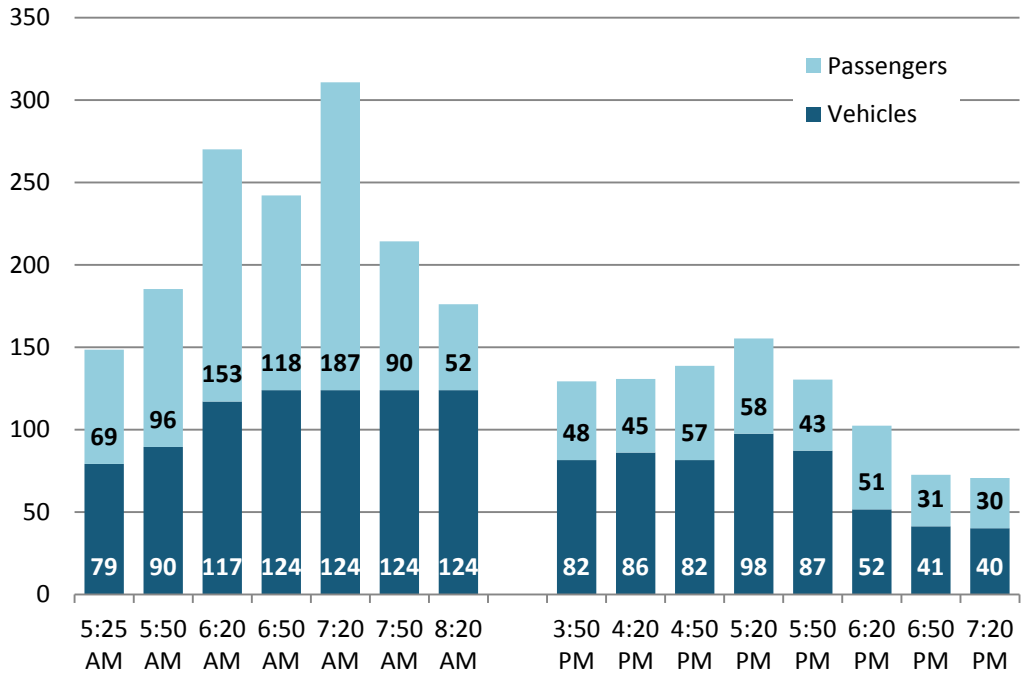
2.1.5 Average Weekday Ridership

Exhibits 2-3 and 2-4 summarize average weekday (Tuesday through Thursday) ferry ridership during May 2010 for the Mukilteo-Clinton route. (Vehicles include the driver and passengers are a combination of walk-on and vehicle passengers.) The Mukilteo-Clinton ferry route experiences high peak directional use as shown by the substantially higher southbound morning passengers traveling by ferry from Clinton to Mukilteo (see Exhibit 2-3) and the returning northbound evening passengers traveling by ferry from Mukilteo to Clinton (see Exhibit 2-4).

Total evening ridership volumes are higher than the morning peak. This is consistent with general transportation demand trends in the Puget Sound region, with morning peak periods primarily dominated by work-commute and school-commute trips. Late afternoon/evening peak periods typically include a greater mix of trip purposes, including work-commute and school-commute as well as discretionary trips such as shopping and entertainment.

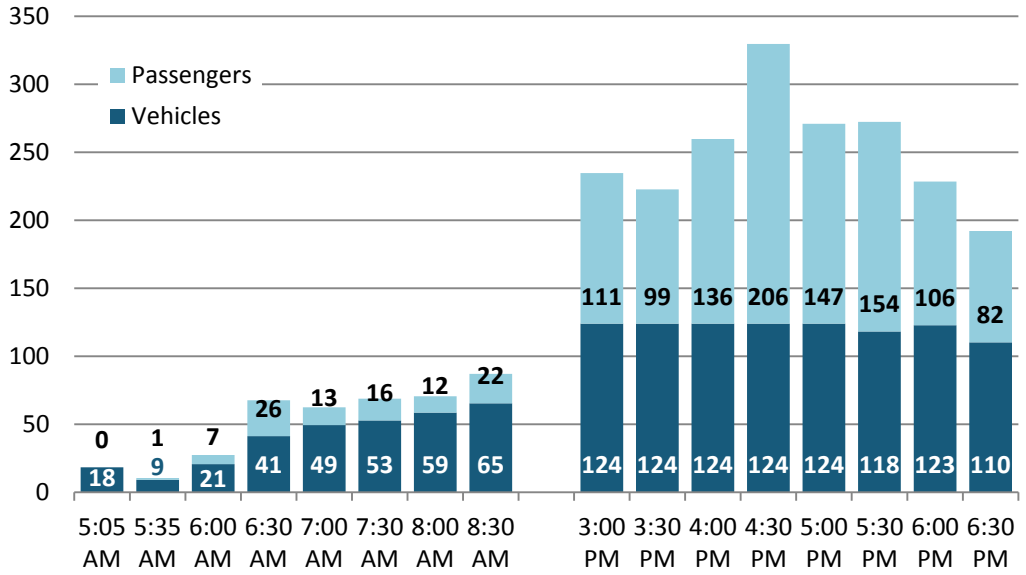
As ridership levels vary during the day, so does how people arrive and depart from the ferry. Because sailings during peak periods in the peak direction experience vehicle demand in excess of ferry capacity, ridership growth during these periods is possible only through an increase in walk-on passengers, vanpools (have priority loading over general vehicle traffic), and increased person occupancy in all other vehicles.

Exhibit 2-3. May 2010 Average Weekday Ferry Ridership (Clinton-Mukilteo)



Source: WSF Fare Box Receipts (for vehicles) and Survey (for passengers)

Exhibit 2-4. May 2010 Average Weekday Ferry Ridership (Mukilteo-Clinton)



Source: WSF Fare Box Receipts (for vehicle) and Survey (for passengers)

As shown in Exhibits 2-3 and 2-4, sailings with a vehicle demand at or close to the vessel limit of 124 vehicles have a larger number of passengers, which comprises a larger number of walk-on passengers compared to vehicle passengers. Walk-on passengers take either one or a combination of modes on each side of the ferry to complete their trips, which includes driving to a park-and-ride lot or parking area, taking transit, getting dropped off or picked up, walking, or riding a bicycle.

Exhibit 2-5 shows the majority of passengers who walk off the ferry at Mukilteo are using bus transit at the Mukilteo ferry terminal in the morning.

Exhibit 2-5. Mode of Choice for Walk-off Ferry Passengers Arriving at the Mukilteo Ferry Terminal from Clinton (2010 Average Weekday)

Ferry Unloading at Mukilteo	Park-and-Ride	Drop Off	Bus Transit	Commuter Rail	Bicycle	Walk
5:25 AM	7	0	42	0	0	6
5:50 AM	21	0	28	12	0	3
6:20 AM	21	0	65	16	1	9
6:50 AM	18	0	24	21	1	7
7:20 AM	33	0	66	23	1	12
7:50 AM	18	0	43	0	1	5
8:20 AM	9	0	10	0	0	4
3:50 PM	1	7	2	1	0	4
4:20 PM	5	2	2	0	0	4
4:50 PM	9	2	1	2	0	4
5:20 PM	9	2	2	1	1	3
5:50 PM	7	2	2	0	1	3
6:20 PM	7	1	1	0	0	2
6:50 PM	10	2	2	0	1	4
7:20 PM	7	2	1	0	0	0

Source: Survey and WSF Model

In the evening, as shown in Exhibit 2-6, passengers who walk on the ferry at Mukilteo are also using bus transit as their preferred travel mode. The use of park-and-ride lots by people who live on Whidbey Island and leave vehicles overnight in Mukilteo, as well as commuter rail service, are prevalent modes of access for people arriving at Clinton on the ferry from Mukilteo. Access to the Mukilteo ferry terminal by walking, bicycling, and drop-off or pick-up is low; however, there is not an official drop-off/pick-up location at the existing Mukilteo ferry terminal.

Exhibit 2-6. Mode of Choice for Walk-on Passengers Leaving the Mukilteo Ferry Terminal for Clinton (2010 Average Weekday)

Ferry Load at Mukilteo	Park-and-Ride	Pick Up	Bus Transit	Commuter Rail	Bicycle	Walk
5:05 AM	0	0	0	0	0	0
5:35 AM	0	0	0	0	0	0
6:00 AM	3	1	1	0	0	0
6:30 AM	4	1	2	0	0	4
7:00 AM	2	0	2	4	0	0
7:30 AM	0	0	3	0	0	3
8:00 AM	0	0	0	0	0	2
8:30 AM	0	0	0	0	0	3
3:00 PM	12	3	29	0	0	4
3:30 PM	9	3	14	0	0	3
4:00 PM	18	4	25	0	0	4
4:30 PM	19	6	75	0	0	9
5:00 PM	17	2	20	26	2	14
5:30 PM	36	4	43	15	0	13
6:00 PM	22	2	21	15	1	3
6:30 PM	10	3	14	14	0	5

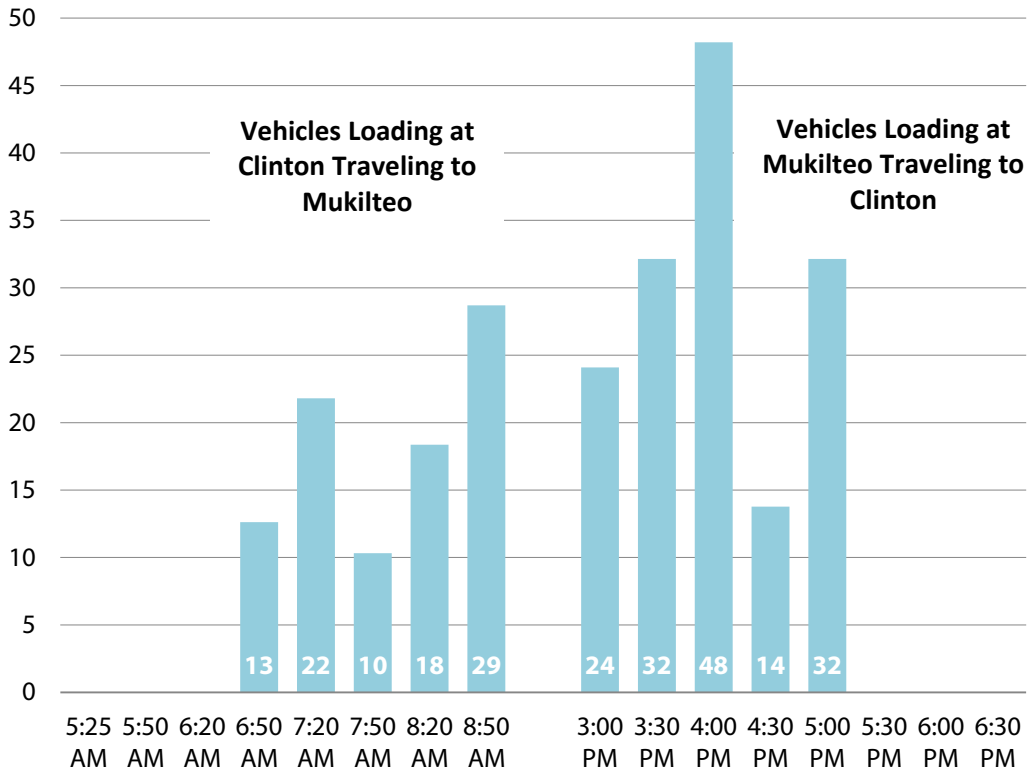
Source: Survey and WSF Model

2.1.6 Ferry Crossing Levels of Service

As a way to identify the point at which demand management or additional capacity investments may be necessary, the *WSDOT Ferris Division Long-Range Plan* identifies an LOS performance standard based on the percentage of total sailings operating at full capacity. When the Level 1 Standard is surpassed, pricing and operational strategies to spread demand are recommended; when the Level 2 Standard is surpassed, additional service is recommended.

Exhibit 2-7 summarizes the average number of vehicles unable to board the next immediate sailing for a typical month such as May because the sailings were at full capacity. This is referred to as "unmet demand" (i.e., on average, the 6:50 AM sailing fills the 124-vehicle capacity and 13 vehicles are unable to board). Exhibit 2-7 also shows some of the southbound morning and northbound evening sailings experience unmet demand. Currently, all walk-on passengers are able to board the next immediate sailing.

Exhibit 2-7. Unmet Vehicle Demand (2010 Average Weekday)



Source: WSF Fare Box Receipts and Survey

The importance of evaluating unmet demand is that it indicates where additional passenger growth can be accommodated. Presently, during sailings where all vehicles cannot be accommodated on the vessel, ridership growth is limited to vanpool, motorcycle, bicycle, and walk-on passengers. Also, unmet vehicle demand may indicate a condition where vehicles waiting for the ferry begin queuing in the shoulder lane outside of the designated ferry terminal holding area; the vehicle holding area for the Mukilteo ferry terminal comprises 24 holding lanes, which can accommodate approximately 10 vehicles per lane (the number of vehicles per lane depends on the length of vehicles).

The LOS performance standard from the *WSDOT Ferries Division Final Long-Range Plan* is used to describe the percent of total daily sailings in which ferries are at their full vehicle capacity for January, May, and August. If vehicle demand for space on ferries grows or continues to exceed vessel capacity, subsequent sailings will also be full, passing excess demand to the next sailing. Only after vehicle demand has decreased sufficiently for vessel capacity to serve waiting vehicles will ferry sailings drop below the performance measure threshold of having less than the ferries' full vehicle capacity.

Northbound travel in the PM peak period is used to calculate the ferry crossing LOS because it has an overall higher travel demand than southbound AM peak period.

Exhibit 2-8 summarizes the percentage of sailings that were full in 2010 and shows that August exceeded the Level 1 performance threshold, but not the Level 2 LOS performance threshold.

Exhibit 2-8. Mukilteo-Clinton Ferry Route Level of Service

Month	Level 1 Standard	Level 2 Standard	2010 Data
January	25%	65%	8%
May	25%	65%	20%
August	30%	75%	35%

Sources: WSDOT 2009 and WSF Fare Box Data

Note: Values are percent of total northbound sailings that are full.

For the Mukilteo-Clinton route, 20 percent of sailings with full vehicle loads is approximately 15 sailings a day (approximately 7.5 hours of service) where vehicles are not able to board the next immediate sailing.

Relationship of Level of Service Standard to Concurrency

Highways of statewide significance are exempt from municipal concurrency requirements, except for circumstances such as Whidbey Island, which has two exclusive connections to the mainland (SR 525, which is the Mukilteo-Clinton ferry route, and SR 20); highways of statewide significance concurrency requirements apply to these facilities. The conformity with concurrency requirements is based on the Level 2 Standard requirements stated in the *WSDOT Ferries Division Final Long-Range Plan*, which are not currently exceeded.

2.1.7 Terminal Operations

The Mukilteo ferry terminal accommodates multiple modes of traffic, each of which arrives at the terminal, loads and unloads, and departs in different manners.

Terminal Arrival

Walk-on passengers include people walking or bicycling from where their trip starts, drivers who park and walk, and transit riders who use bus and commuter rail. All walk-on passengers have an associated walking travel time to the SR 525/Front Street intersection, as well as some level of delay at this intersection prior to entering the passenger loading area. Exhibit 2-9 summarizes the modeled travel times for walking from the Mukilteo Station, bus zone, and southern parking lots to the Mukilteo ferry terminal. The modeled travel times assume a standard distribution of walking speeds, which does not fully account for passengers walking quickly to reach their destination.

Exhibit 2-9. Walk Travel Times to the Mukilteo Ferry Terminal (PM Peak Period)

Location	To Terminal (minutes)
Mukilteo Station	8.6
Bus Zone/Parking Lot South of Front Street	1.0
Parking Lot South of Second Street	4.8

Source: VISSIM Model 2012

Unlike most other WSF terminals, ferry and non-ferry vehicle traffic are not separated at the Mukilteo ferry terminal. The Mukilteo ferry terminal transfer span connects directly to the SR 525-Front Street intersection, which is not signalized. Front Street and SR 525 also serve non-ferry traffic traveling to destinations along the waterfront. These destinations include Mukilteo Lighthouse Park, Mukilteo Station, Mount Baker Terminal, NOAA Fisheries Service Mukilteo Research Station, park-and-ride lots, private residences, public access and waterfront facilities, and businesses along Front Street.

Vehicles arriving at the Mukilteo ferry terminal travel northbound along SR 525 and enter the holding lanes through one of three tollbooths. According to WSF, ferry staff can process approximately 2.5 vehicles per minute per booth, which includes accepting payment, giving change, and directing commuters to their holding lane. Holding lane 1 is for motorcycles and bicycles; lanes 2 and 3 are reserved for vanpools and registered carpools; lanes 4, 5, and 6 are reserved for larger-sized vehicles; and lanes 7 through 24 are for all other vehicles and unregistered carpool traffic.

Ferry Unloading and Loading

Walk-on passengers are allowed to walk off the ferry first while the vehicles remain on the ferry. It takes, on average, 19 seconds for all passengers to reach the passenger terminal (see Exhibit 2-10). Walk-on passengers who do not quickly cross the SR 525/Front Street intersection experience additional delay while vehicles unload. In early 2011, a traffic signal was constructed at the Mukilteo ferry terminal that stops unloading ferry traffic for 30 seconds, which occurs once, allowing pedestrians to cross the intersection.

The vehicle unloading pattern consists of releasing the center two lanes first (used by larger-sized vehicles), followed by the outer lanes on the main floor and the upper lanes last; all vehicles are received by two southbound lanes on SR 525 that taper to one lane on the south side of Fifth Street. Unloading vehicles takes just over 4 minutes, on average (see Exhibit 2-10). The sequence and durations of ferry unloading and loading were collected on December 15, 2010, and are summarized in Exhibit 2-10.

Exhibit 2-10. Ferry Unloading and Loading Average Duration at Mukilteo

Ferry Arrival	Walk-Off	Vehicle Unloading	Walk-On	Vehicle Loading
		(minutes)		
4:00 PM	0:24	4:14	1:02	7:54
4:30 PM	0:21	3:05	0:32	9:26
5:00 PM	0:12	5:13	0:49	7:56
Average	0:19	4:10	0:47	8:25

Source: Field Survey, December 2010

After the ferry has unloaded and is ready to load passengers destined for Clinton, all walk-on and bicycle passengers are loaded first. These commuters exit the passenger loading area and walk across the transfer span to the ferry, which typically takes less than 1 minute (see Exhibit 2-10).

After the walk-on passengers and bicyclists have boarded the ferry, WSF staff manually direct each vehicle holding lane for loading. Motorcycles, vanpools, and registered carpools are the first vehicles to load from ferry terminal holding lanes 1, 2, and 3. Larger-sized vehicles in holding lanes 4, 5, and 6 load third and queue in the two center lanes of the main floor of the ferry. The remaining vehicles in lanes 7 through 24 are loaded last; the lane order is dependent on the last lane loaded on the previous sailing. At any time during the loading process, the WSF staff traffic controller may stop loading to allow traffic on SR 525 and Front Street to pass through the intersection; however, loading will only be temporarily stopped after the entire lane has loaded. This is in part to allow buses to access the bus stop. The vehicle loading process takes less than 9 minutes (see Exhibit 2-10).

Finally, after the motor vehicles have finished loading, any remaining walk-on passengers in the passenger waiting area are allowed to board the ferry. The separation of walk-on passenger loading before and after the motor vehicles is done to minimize the risk of vehicle-to-pedestrian collisions.

During the ferry unloading and loading processes, which take approximately 14 minutes, queues tend to form in the ferry lane and along SR 525.

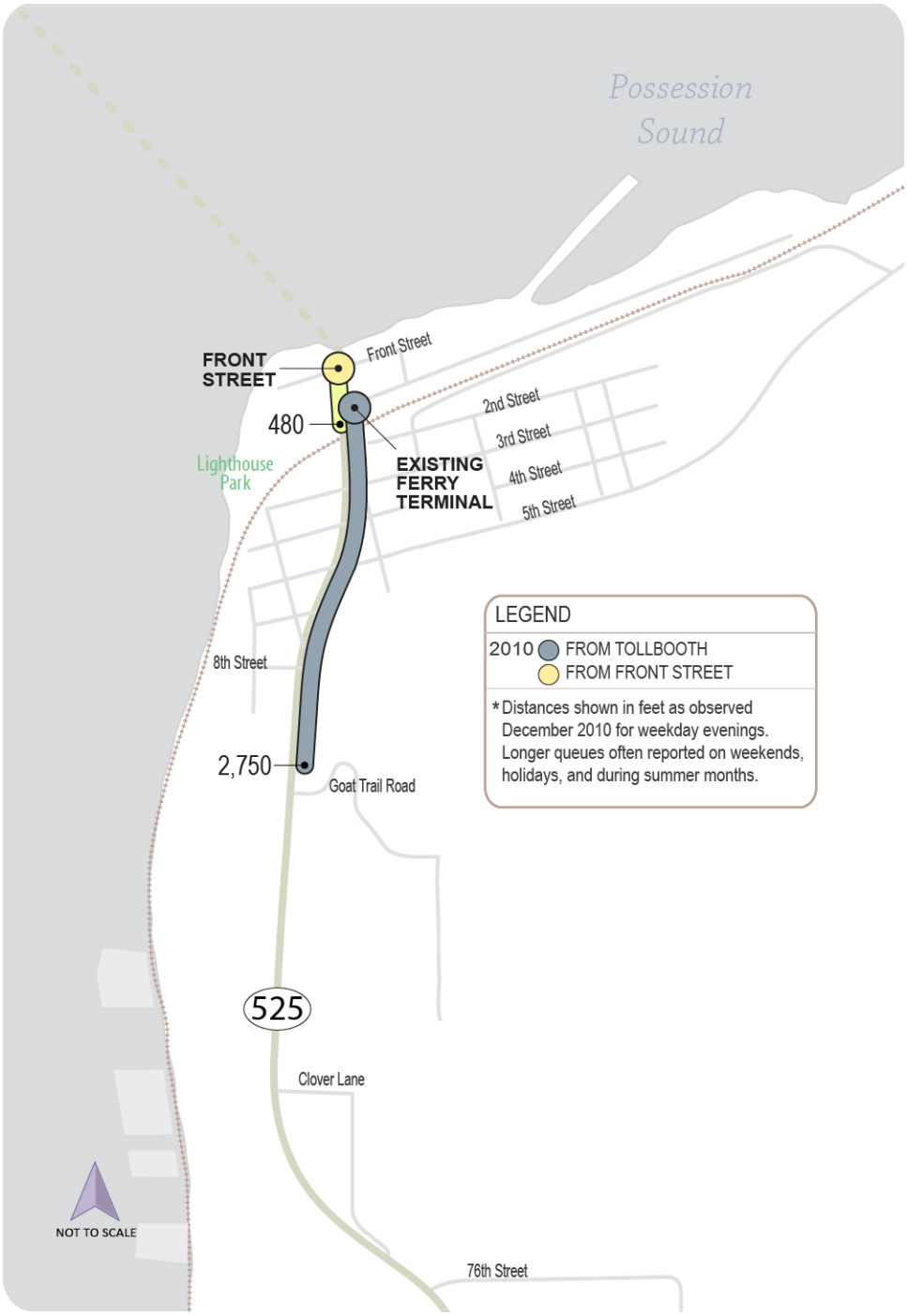
Ferry Shoulder Queuing

Exhibit 2-11 shows queue lengths from a field survey in December 2010, which provided a baseline for the analysis. Queues can be longer at other times of the year such as Fridays, holidays, and during the summer, when ferry shoulder queues can extend beyond Goat Trail Road. Queue lengths are a metric for evaluating the roadway operations and they indicate if the operations of one intersection affect an adjacent intersection. The queue lengths were included as part of the micro-simulation analysis of traffic conditions at the Mukilteo ferry terminal.

As summarized in Exhibit 2-11, the vehicle queue from the SR 525/Front Street intersection extends approximately 480 feet from Front Street to just north of the SR 525 bridge during the PM peak period. This queue length represents the maximum extent that vehicles spill back onto SR 525 from the Front Street intersection during the peak hour, which includes at least one ferry loading and unloading operation. The queue length on SR 525, south of Front Street, is not long enough to affect downstream intersections.

The shoulder queuing from the tollbooths along SR 525 affects a number of downstream intersections and driveways, as vehicles move slowly through the shoulder lane during times of higher ferry use. The City of Mukilteo reports the queues can extend as far as Olympic View Middle School, which is near 76th Street.

Exhibit 2-11. 2010 Queue Lengths at the Mukilteo Ferry Terminal



Source: Field Survey, December 2010

Terminal Departure

Walk-off passengers departing the Mukilteo ferry terminal experience additional delay at the SR 525/Front Street intersection due to local (non-ferry) traffic, and vehicle ferry traffic during unloading and loading operations. Exhibit 2-12 summarizes the travel times for the different destinations of walk-off passengers. Similar to Exhibit 2-9, these modeled travel times assume a standard distribution of walking speeds.

Exhibit 2-12. Walk Travel Times from the Mukilteo Ferry Terminal (PM Peak Period)

Location	From Terminal (minutes)
Mukilteo Station	12.8
Bus Zone/Parking Lot South of Front Street	2.1
Parking Lot South of Second Street	8.4

Source: VISSIM Model 2010

The walk times departing the terminal (see Exhibit 2-12) are longer than the arriving walk times (see Exhibit 2-9) because walk-off passengers crossing SR 525 typically have to wait for unloading vehicle traffic to pass. While vehicles unload from the ferry, traffic along SR 525 and Front Street is stopped by WSF staff. A traffic signal at the Mukilteo ferry terminal stops unloading ferry traffic for 30 seconds, which occurs once, allowing pedestrian and vehicle traffic on SR 525 and Front Street to proceed. Nearly all of the motor vehicle traffic departing the ferry travels south along SR 525 and very few vehicles have local destinations along Front Street.

Mukilteo Transfer Span

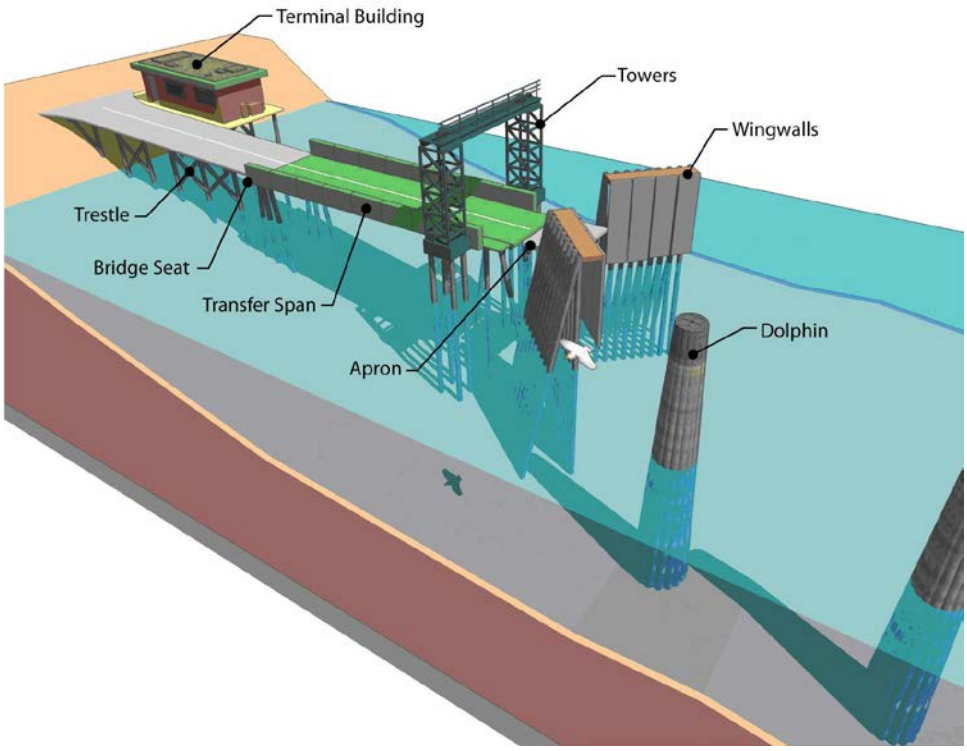
The Mukilteo transfer span is one of the oldest transfer spans currently used by WSF, and of the older transfer spans is the only one used regularly. Exhibit 2-13 summarizes the number of lost ferry trips on the Mukilteo-Clinton route occurring in the past 5 years due to mechanical and maintenance issues with the Mukilteo transfer span. See Exhibit 2-14 for an illustrated example of ferry terminal elements.

Exhibit 2-13. Reasons for Lost Sailings due to Issues with the Mukilteo Transfer Span

Year	Lost Trips due to Mechanical Failure	Lost Trips due to Maintenance
2006	2	6
2007	0	0
2008	26	0
2009	0	4
2010	0	0

Source: WSF

Exhibit 2-14. General Terminal Schematic



2.1.8 Navigable Waterways

The Rivers and Harbors Act defines navigable waters of the United States as those waters subject to the ebb and flow of the tide shoreward to the mean high water mark and/or presently used, or have been used in the past, or are susceptible for use to transport interstate or foreign commerce. This term includes coastal and inland waters, lakes, rivers, and streams that are navigable, and the territorial seas. The existing Mukilteo ferry terminal is situated in navigable waters and ferries traveling to and from Clinton across Possession Sound pass through an existing shipping lane. The existing Mukilteo-Clinton ferry route does not impede other vessels operating within or outside the shipping lane that follow general navigation rules.

2.1.9 Mukilteo Ferry Terminal Facility Safety

Potential safety issues within the ferry terminal are categorized into the following three groups:

- Vehicle-to-pedestrian collisions
- Vehicle-to-vehicle collisions
- Terminal enclosure

Striped crosswalks along pedestrian travel routes within the terminal, a separate walk-on passenger loading area, and separated walk-on and walk-off times help

minimize the potential for vehicle-to-pedestrian collisions. Over the past 5 years, there have been no vehicle-to-pedestrian collisions reported.

Vehicle-to-vehicle collisions within the terminal area are rare. Tollbooths assist in lowering speeds while boarding and WSF staff-directed and delineated holding lanes help minimize confusion.

Regulations under the Homeland Security Act require that the ferry terminal be enclosed such that traffic entering the terminal area cannot exit the area without boarding the ferry. The purpose of this regulation is to allow WSF to prevent public access to and from the facility during heightened security alerts. The existing terminal configuration does not allow WSF to lock down the facility and is not compliant with the Homeland Security Act.

2.2 ROADWAY NETWORK

Three components of the roadway network are described in this section: roadway characteristics, traffic volumes, and traffic operations.

Roadway characteristics refer to the collection of physical attributes and defined set of uses of the roadway system. The number of lanes and intersection control (e.g., traffic signal, stop sign, roundabout) are examples of physical attributes, and functional classifications and speed limits are examples of defined uses. This collection of roadway characteristics is important because they influence how drivers interact with their physical environment.

Traffic volumes are the number of motor vehicles that use the roadways and are further characterized by the time of day, direction of travel, and turning movements. These traffic volume characteristics influence how drivers interact with other drivers.

Traffic operations is the term used to describe how well or poorly the roadway network functions and is commonly referred to as congestion. The traffic operating conditions are the cumulative result of the interactions between drivers, their environment, and other drivers.

2.2.1 Roadway Characteristics

This section describes the major roadways in the study area that are used by passengers of the ferry system serving Mukilteo and Clinton. These roadways are of particular interest because they represent the locations where the project's impacts would most likely affect traffic.

SR 525 is the only roadway in the study area providing access to the Mukilteo ferry terminal tollbooths and holding area (Exhibit 2-15). SR 525 is a four-lane highway (two lanes in each direction) from the Interstate 5 (I-5)/I-405 interchange (Exit 182) and continues as a four-lane roadway to Lincoln Way. Within this section, access to SR 525 is allowed only at interchanges, and the posted speed limit is 60 miles per hour (mph). From north of Lincoln Way to Paine Field Boulevard, SR 525 (also known as

Mukilteo Speedway) has four lanes, access is allowed at intersections, and the posted speed limit is reduced to 40 mph. Traffic at intersections is controlled either with stop signs or traffic signals, and right- and left-turn lanes are provided at nearly all intersections. Between Paine Field Boulevard and Church Avenue, SR 525 narrows to a two-lane roadway, intersection turn lanes are less frequent, and the speed limit is lowered to 35 mph. There is a two-way left-turn lane along SR 525 from 84th Street SW to 76th Street SW; however, north of 76th Street SW the two-way left-turn lane is replaced with a ferry holding lane. North of Church Avenue to the ferry terminal, the posted speed limit is reduced to 25 mph.

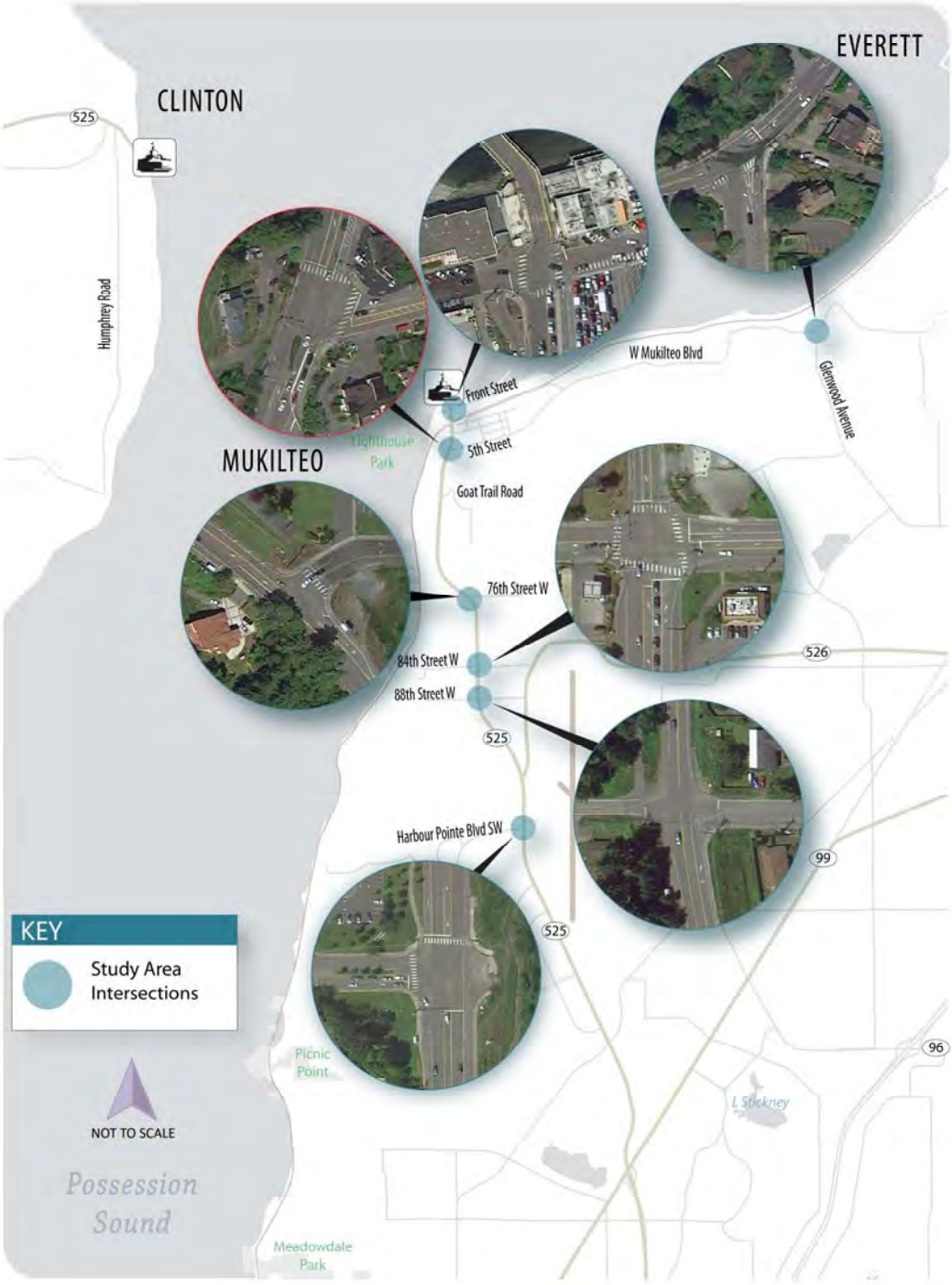
Fifth Street (also known as West Mukilteo Boulevard) connects the city of Mukilteo with the city of Everett. This two-lane roadway provides east-west travel with one lane in each direction. Intersections with public streets are typically controlled with stop signs and turning lanes are often absent. Although the length and connectivity of this roadway allows for regional travel, short intersection spacing, relatively low posted speed limits (25 to 35 mph), and frequent driveway connections indicate a balance between mobility and private property access.

SR 526 (also known as 84th Street SW and Boeing Freeway) originates as an intersection on the east side of SR 525 and extends east to an intersection with Paine Field Boulevard with two lanes in each direction. The posted speed limit in this section of SR 526 is 35 mph. Beyond its connection to Paine Field Boulevard, SR 526 transitions to a posted speed limit of 45 mph; a few intersections with turn lanes provide access to Boeing Company properties. East of Airport Road, SR 526 continues as a four-lane roadway (excluding acceleration/deceleration lanes) to connect with I-5, which is Exit 189; access along this portion of SR 526 is restricted to interchanges only and the posted speed limit is increased to 60 mph.

Mount Baker Avenue is a two-lane access road that provides a connection across the BNSF Railway tracks between Mukilteo Lane and properties to the north. Mount Baker Avenue provides emergency access to these properties and is not a public access road.

The remaining roadways within the study area are generally two-lane roads with speed limits ranging from 25 to 35 mph and accommodate moderate- to short-distance trips that connect to SR 525. As a result, the importance of these roadways, for the purposes of this study, is based on how they operate at their intersection with SR 525. The key intersections that are expected to experience the most traffic effects from the project have been selected as study intersections and are shown in Exhibit 2-15. The intersections of SR 525/Harbour Pointe Boulevard North, SR 525/ 84th Street SW, and SR 525/Fifth Street are controlled with traffic signals, while the remaining study intersections along the corridor are controlled with stop signs on the cross street. In addition to the roadway characteristics described above, intersection turn lanes play an important role in how the roadway network operates. The existence of multiple through lanes and exclusive left- or right-turn lanes affect the overall capacity and LOS of an intersection.

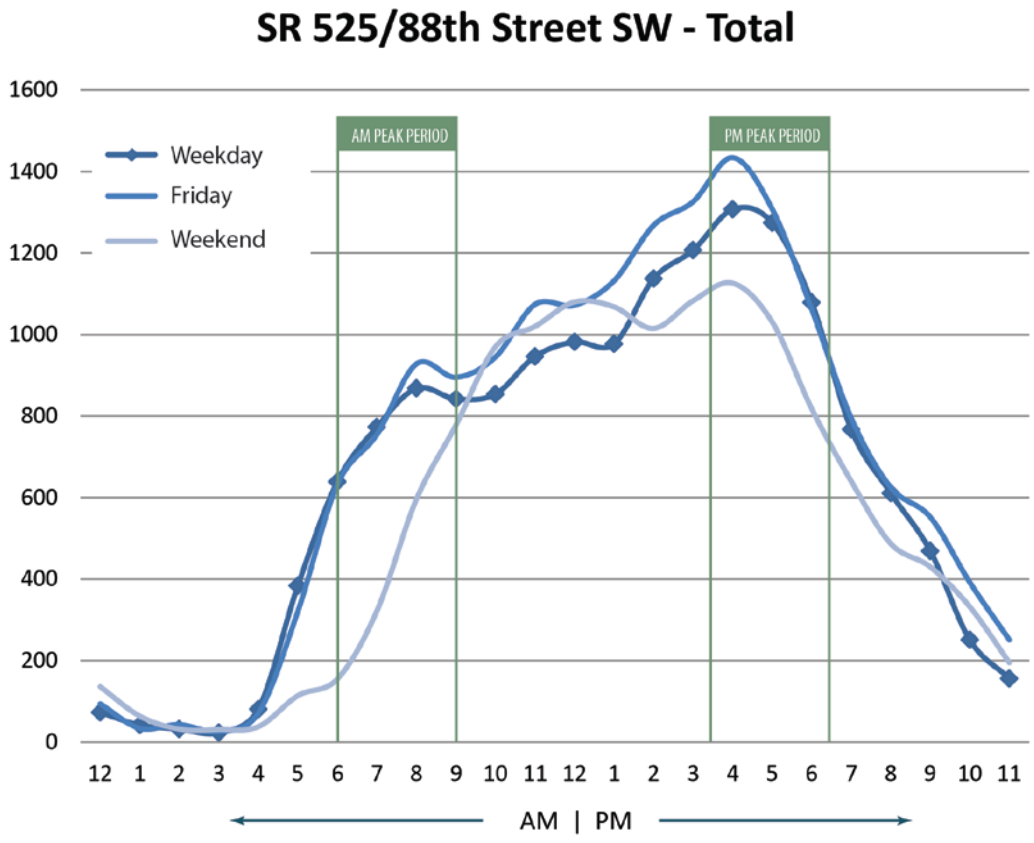
Exhibit 2-15. Study Area Intersections



2.2.2 Traffic Volumes

Twenty-four-hour traffic volume data were collected along seven sections of SR 525 from November 7, 2010, through November 13, 2010, and from January 18, 2011, through January 25, 2011. Exhibits 2-16 and 2-17 show the combined two-way vehicle volumes throughout the week on SR 525 near 88th Avenue West and 76th Avenue West, respectively.

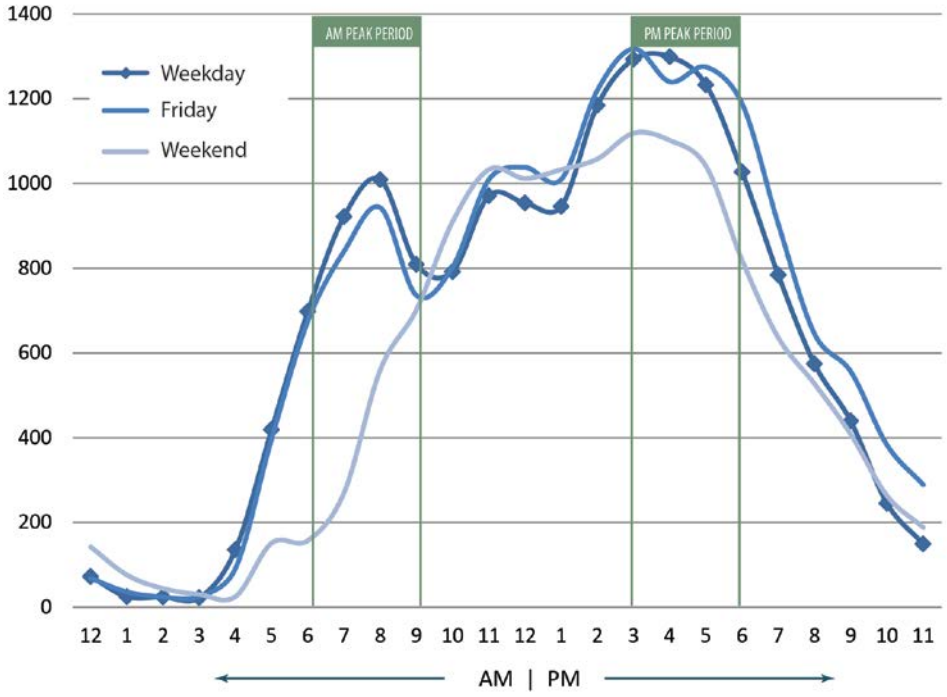
Exhibit 2-16. Two-Way Traffic Volume Daily Distribution on SR 525 near 88th Avenue West



Source: November 2010 Traffic Counts

As shown in Exhibits 2-16 and 2-17, weekday (Tuesday through Thursday), average vehicle volumes on SR 525 are only slightly lower than Friday volumes, but are higher than weekend volumes. Also, the evening peak period volumes are almost double the morning peak period vehicle volumes because vehicular traffic builds gradually during the day from roughly 4:00 AM to 5:00 PM.

Exhibit 2-17. Two-Way Traffic Volume Daily Distribution on SR 525 near 76th Avenue West

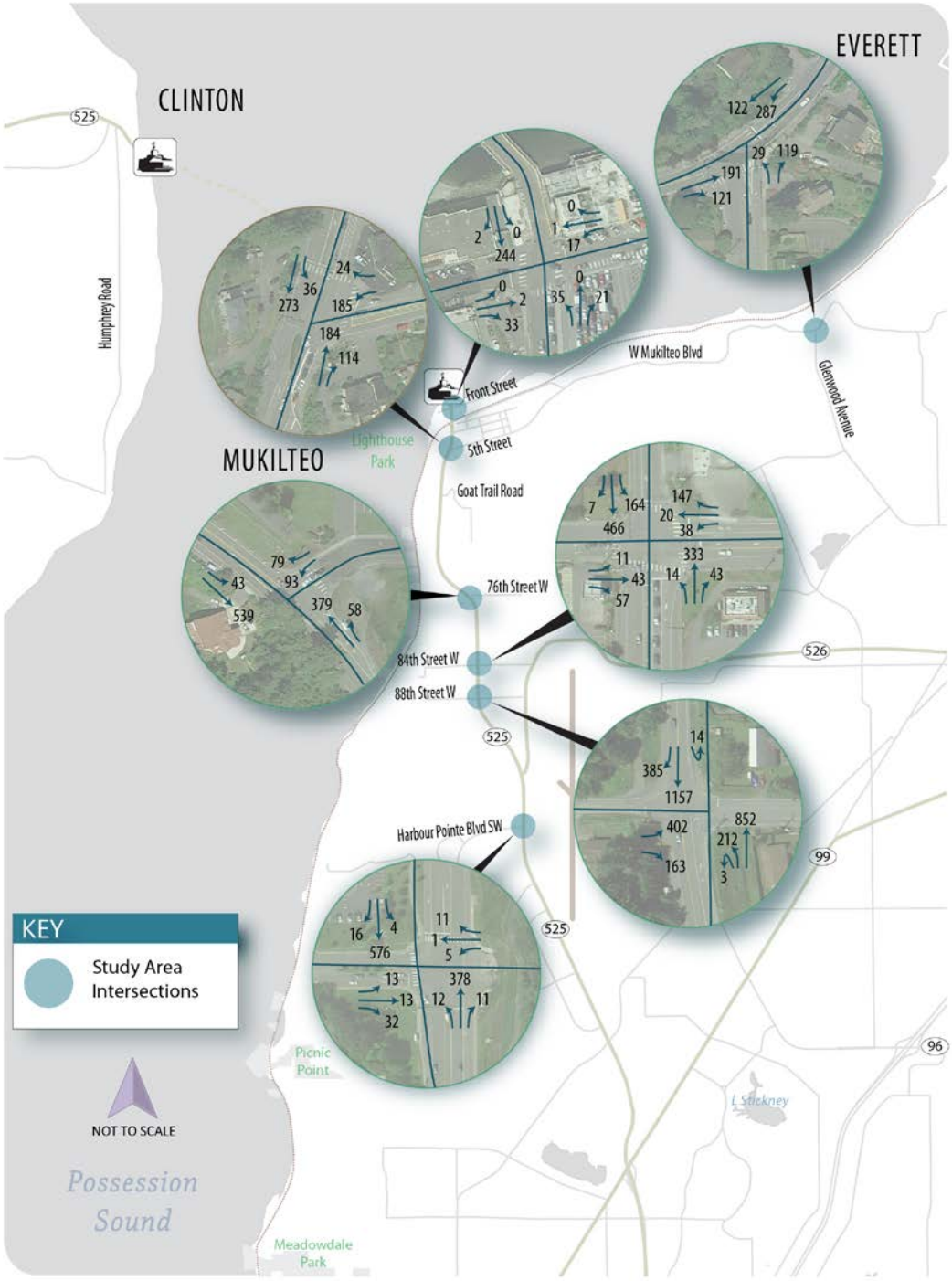


Source: January 2011 Traffic Counts

Study area intersections are illustrated in Exhibits 2-18 and 2-19. Intersection turning moving counts were collected on September 15, 2010, November 9 and 10, 2010, and January 19 and 20, 2011. Morning peak period counts were collected from 6:30 AM to 9:00 AM and evening peak period counts were collected from 3:30 PM to 6:30 PM. The system-wide peak hours (8:00 AM to 9:00 AM and 4:30 PM to 5:30 PM) were used for the traffic analysis.

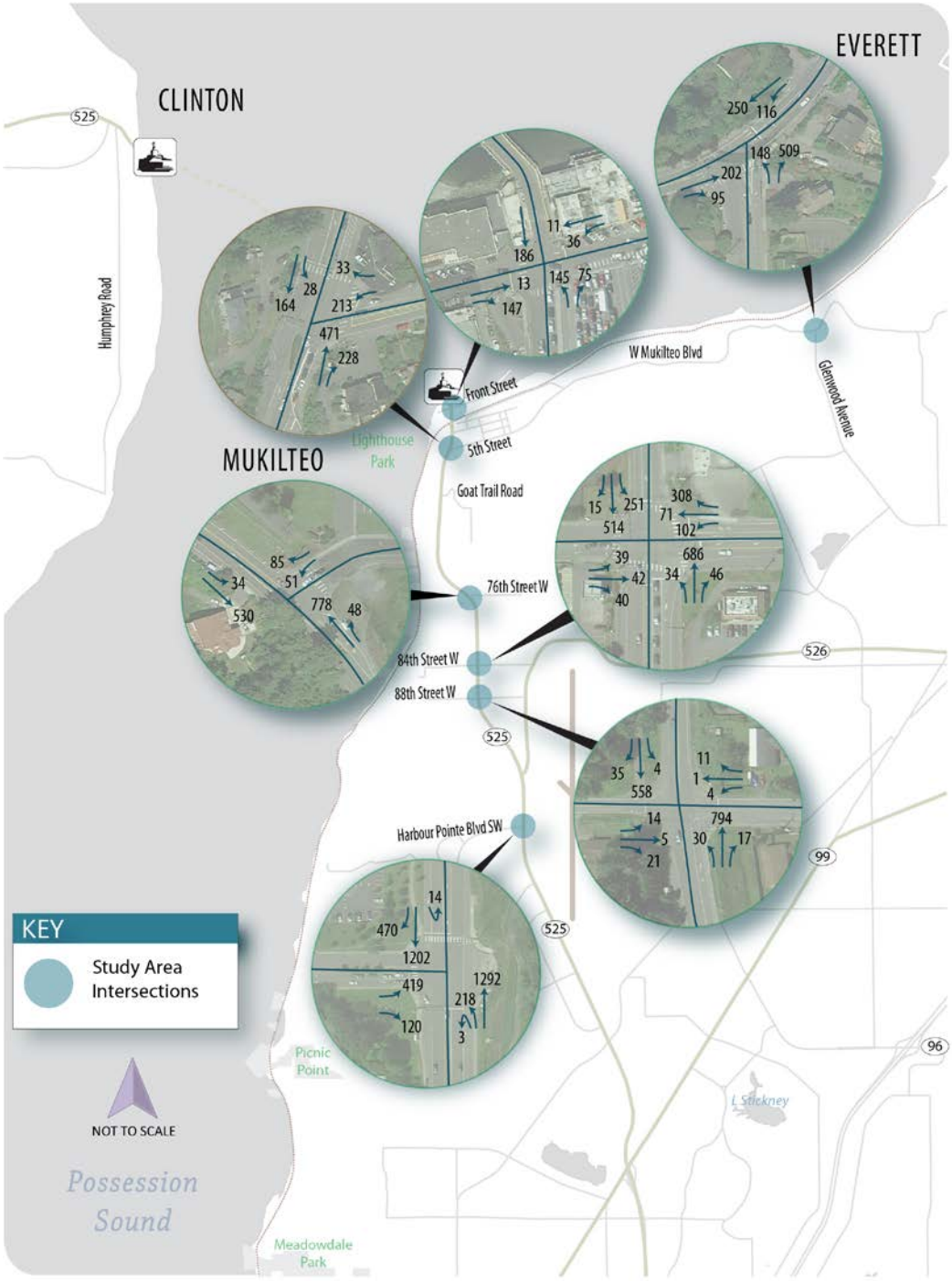
Because the WSF ferry ridership model was developed to estimate typical ridership (May is considered a typical month, see Section 2.1.3), the Washington State Department of Transportation (WSDOT) *Assignment of Factors Report* (WSDOT 2008) was used to adjust November and January traffic volumes to May. The *Assignment of Factors Report* is prepared by WSDOT using data collected year-round and provides seasonal adjustment factors that are used to standardize data. Based on this report, traffic volume data collected in September were multiplied by a seasonal adjustment factor of 98.9 percent, November data were multiplied by a seasonal adjustment factor of 107.6 percent, and January data were multiplied by a seasonal factor of 113.0 percent (WSDOT 2008). Exhibits 2-18 and 2-19 show the peak hour intersection turning movement counts, which have been seasonally adjusted to the month of May.

Exhibit 2-18. Existing AM Peak Hour Vehicular Turning Movement Counts



Source: WSDOT, September 2010, November 2010, and January 2011 Traffic Counts

Exhibit 2-19. Existing PM Peak Hour Vehicular Turning Movement Counts



Source: WSDOT, September 2010, November 2010, and January 2011 Traffic Counts

2.2.3 Traffic Operations

LOS is a quantified estimate of how well, or poorly, the transportation system functions. The most common industry standard for evaluating LOS is based on the *Highway Capacity Manual* (HCM), Special Report 209 (Transportation Research Board [TRB] 2000). Using this methodology, traffic conditions are assessed with respect to the average intersection delay (seconds/vehicle). The letter A is used to describe the least amount of congestion and best operations; the letter F indicates the highest amount of congestion and worst operations. The 2000 HCM LOS ratings are shown in Exhibit 2-20.

Exhibit 2-20. Level of Service Ratings

Level of Service (LOS) Rating	Average Delay for Signalized Intersections (seconds/vehicle)	Average Delay for Unsignalized Intersections (seconds/vehicle)
A	0–10	0–10
B	> 10–20	> 10–15
C	> 20–35	> 15–25
D	> 35–55	> 25–35
E	> 55–80	> 35–50
F	> 80	> 50

Source: Highway Capacity Manual (TRB 2000)

An LOS analysis was conducted for the study intersections using the software program Synchro 7 (Build 773) for intersections outside of the ferry terminal. For the SR 525/Front Street intersection, the software program VISSIM 5.2 was used due to the complex boarding patterns that include manual traffic control by WSF staff. Only the PM peak hour was assessed because it has higher traffic volumes when compared to the AM peak hour.

As summarized in Exhibit 2-21, during the PM peak hour, the SR 525/88th Street SW and SR 525/Front Street intersections operate at an LOS E, which indicates a high level of delay. This LOS fails to meet the City of Mukilteo LOS D standard, which is the maximum level of delay the City has defined as acceptable. All other study intersections operate at LOS D or better during the AM and PM peak hours.

Exhibit 2-21. 2010 Level of Service Summary

Intersection	Control Type	LOS Standard	AM Peak		PM Peak	
			LOS	Delay (seconds per vehicle)	LOS	Delay (seconds per vehicle)
SR 525/Harbour Pointe Boulevard North	Signal	D	C	23	C	21
SR 525/88th Street SW	Stop Sign	D	C	21	E	43
SR 525/84th Street SW and SR 526	Signal	D	A	6	C	28
SR 525/76th Street SW	Stop Sign	D	C	20	C	20
SR 525/Fifth Street	Signal	D	B	11	D	51
SR 525/Front Street	Stop Sign	D	n/a	n/a	E	48
West Mukilteo Boulevard/Glenwood Avenue	Stop Sign	D	B	11	B	14

Source: Existing 2010 Synchro Model and Existing 2010 VISSIM Model for SR 525/Front Street intersection

2.2.4 Roadway Network Safety

As described above, the roadway characteristics influence how drivers interact with the physical environment, traffic volumes influence how drivers interact with other drivers, and LOS is a means to describe and quantify the cumulative interactions with respect to how well, or poorly, the system operates.

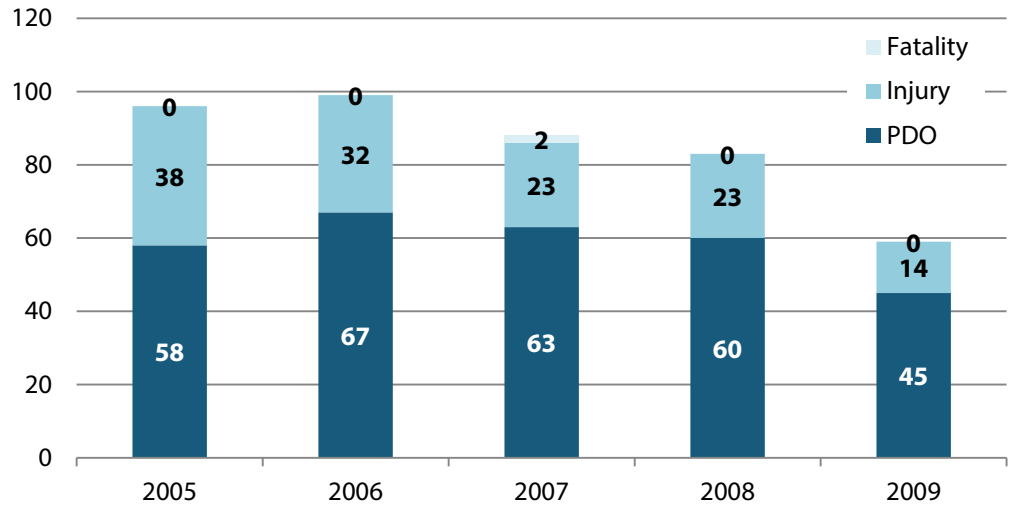
To describe these cumulative interactions with respect to safety, an analysis of the collision history of the roadway network is required. Unlike traffic operations, collision analyses primarily rely on trends, because there are additional factors that play a role in a collision. As a result, collision analyses attempt to identify trends in collision frequency, severity, and type; other factors such as surface and lighting conditions may also be examined if trends in frequency, severity, and type are evident.

To identify trends in collision frequency, severity, and type, collision data for the past 5 complete and consecutive years were analyzed (2005 through 2009). Collision data older than 5 years were not analyzed because changes to the transportation system occur over a span of 5 or more years and their causes may not be representative of recent conditions. Collision data for 2010 were also not included because all collision data for 2010 had not been compiled and prepared at the time when the analysis was completed.

The collision analysis for this project covered the length of the SR 525 corridor within the study area (milepost 5.15 to milepost 8.47) and the West Mukilteo

Boulevard/Glenwood Avenue intersection that is included in the traffic analysis. Exhibit 2-22 shows the general trends in collision frequency, severity, and type for the SR 525 corridor and West Mukilteo Boulevard/Glenwood Avenue intersection as a whole.

Exhibit 2-22. Study Area Collision Trends along SR 525 (2005 through 2009)



Source: WSDOT 2005 to 2009 data

Exhibit 2-22 shows that the proportion of collision severity (property damage only [PDO], injury, and fatality) has remained similar over the last several years and that the overall frequency of collisions for the SR 525 corridor has been in decline. The annual average collision rate, based on 2005 to 2009 data, is 1.33 collisions per million vehicle miles (coll/MVM) traveled, which is lower compared to other principal arterials in the area (2.77 coll/MVM; WSDOT 2006).

Within the SR 525 corridor, it is also helpful to examine the collision frequency and severity by location to determine if there are specific areas that experience more collisions than others. Exhibit 2-23 provides collision data at the study intersections; the full list of intersections along SR 525 and their collision rates is provided in Appendix A.

Exhibit 2-23. Study Intersection Collision Trends (2005 through 2009)

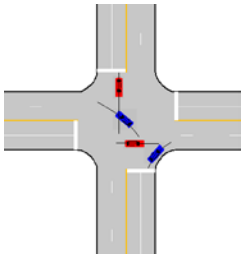
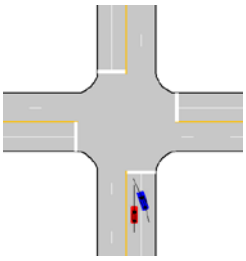
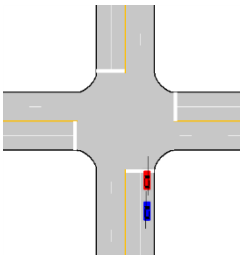
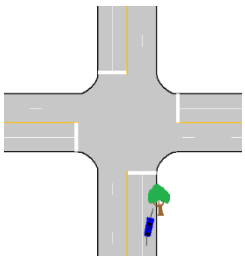
Intersection	SR 525/ Harbour Pointe Boulevard N	SR 525/ 88th Street SW	SR 525/84th Street SW	SR 525/ 76th Street SW	SR 525/ 5th Street	W Mukilteo Blvd /Glenwood Avenue	Subtotal
Property Damage Only	59	6	27	5	21	3	**121**
Injury	30	2	16	6	7	0	**61**
Fatality	0	0	0	0	0	0	**0**
Head On	0	0	2	0	1	0	**3**
At Angle	13	5	12	5	11	0	**46**
Sideswipe	11	0	1	1	1	0	**14**
Rear End	53	2	21	4	10	3	**93**
Front End	2	0	3	0	3	0	**8**
Object	6	0	1	1	1	0	**9**
Ditch/Over turn	0	1	1	0	0	0	**2**
Pedestrian/ Bicycle	4	0	2	0	1	0	**7**
Subtotal	**178**	**16**	**86**	**22**	**56**	**6**	
Daily Volume	46,725	18,675	27,088	19,075	14,213	16,513	
Average Annual Collisions (5 Years)	17.8	1.6	8.6	2.2	5.6	0.6	
Average Annual Collision Rate (coll/MEV)	1.04	0.23	0.87	0.32	1.08	0.10	

Source: WSDOT

Exhibit 2-23 also shows that the majority of collisions at these intersections result in property damage only. The most frequent collision types at these intersections include at-angle, sideswipe, rear end, and fixed object.

Intersections with collision rates higher than 1.00 coll/MEV are typically considered to have a relatively high collision rate that may merit additional investigation from a safety perspective. The SR 525/Harbour Pointe Boulevard North and SR 525/ Fifth Street intersections have collision rates slightly higher than 1.00 coll/MEV. Although it is nearly impossible to identify a single cause or set of causes for a collision, Exhibit 2-24 provides insight on the most frequent contributing factors to collisions in addition to driver error.

Exhibit 2-24. Collision Types and Potential Causes

Collision Type	Potential Causes
At-Angle 	1. Poor sight distance of left-turn vehicle to oncoming through traffic 2. High left-turn and/or oncoming through volume, insufficient gaps 3. Excessive approach speeds 4. Inappropriate signal timings
Sideswipe 	1. Travel lanes not properly marked 2. Roadway tapers 3. Other roadway design deficiencies
Rear End 	1. Inappropriate signal timings 2. Poor visibility of traffic signals 3. Excessive approach speeds 4. Stop-and-go congestion
Fixed Object 	1. Roadway horizontal and/or vertical curvatures and poor sight distance 2. Insufficient lateral clearance 3. Excessive approach speeds

2.3 NON-MOTORIZED CONDITIONS

2.3.1 Pedestrian Conditions

SR 525 is the only roadway link between the Mukilteo city center and the ferry terminal. The SR 525 pedestrian facilities crossing the BNSF tracks consists of 3-foot-wide sidewalks on both sides of the bridge. These facilities meet some but not all Americans with Disabilities Act (ADA) standards, and do not meet current WSDOT design standards for 4-foot-wide sidewalks.

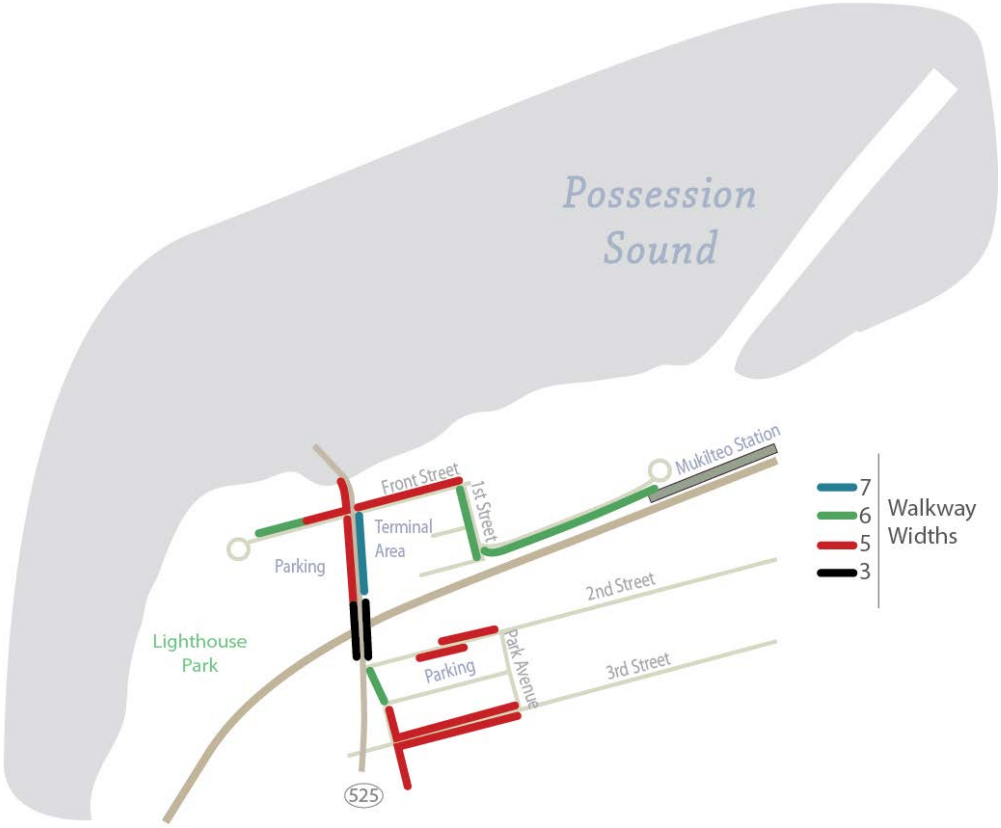
The terminal facility was built in the 1950s and includes a single sidewalk connection on the west side of the ferry ramp to Front Street from the passenger facilities building. Between Front Street and the BNSF bridge, there is a 5-foot-wide sidewalk on the west side of SR 525 and a 7-foot-wide sidewalk on the east side of SR 525 adjacent to the ferry terminal holding area.

2.3.2 Sidewalk and Crosswalk Conditions

East of the Mukilteo ferry terminal along Front Street, between SR 525 and First Street, there is a 5-foot-wide sidewalk on the north side, adjacent to existing retail, restaurants, and the motel. On the south side of Front Street, there is a 7-foot-wide painted sidewalk located between the travel lanes on Front Street and the ferry holding lanes. West of the Mukilteo ferry terminal and SR 525 along Front Street, there are sidewalks on both sides of the street except for a short segment on the south side in front of the Diamond Knot Brewery. First Street includes a 6-foot-wide sidewalk on the west side of the road between Front Street and the entrance to Mukilteo Station.

The SR 525/Front Street intersection is unsignalized and includes designated crosswalks across all four legs of the intersection. Signs forbid pedestrians from crossing between the northeast and northwest corners of the intersection when the ferry is loading and unloading vehicles. A southbound bus stop with a two-coach layover area, shelter, and schedule sign post is located on the southwest corner of the intersection. The northbound bus stop is an in-lane stop on SR 525 south of Front Street. Community Transit and Everett Transit buses terminate service at the ferry terminal and drop off passengers on the northwest corner of the SR 525/Front Street intersection. Exhibit 2-25 illustrates the existing pedestrian system of sidewalks and crosswalks around the Mukilteo ferry terminal.

Exhibit 2-25. Existing Pedestrian Facilities near Mukilteo Ferry Terminal



The existing pedestrian facilities are not ideal for two primary reasons: 1) pedestrians are exposed to motorized traffic at the SR 525/Front Street intersection during ferry loading, and 2) they must navigate narrow sidewalks. During the ferry loading and unloading procedure, WSF personnel help to control traffic at the SR 525/Front Street intersection by intermittently assisting pedestrian crossings and non-ferry traffic through the intersection.

Pedestrians accessing the ferry terminal or areas west of the terminal from the east side of the terminal must either wait for all vehicles to load or find a safe gap in the loading of vehicles. Pedestrians who use the SR 525 bridge to access the terminal must walk on sidewalks that are 3 feet wide. WSDOTs *Design Manual* (version M 22.01.07), Section 1501.05(2)(a)3 states "the minimum clear width for an ADA pedestrian accessible route is 4 feet."

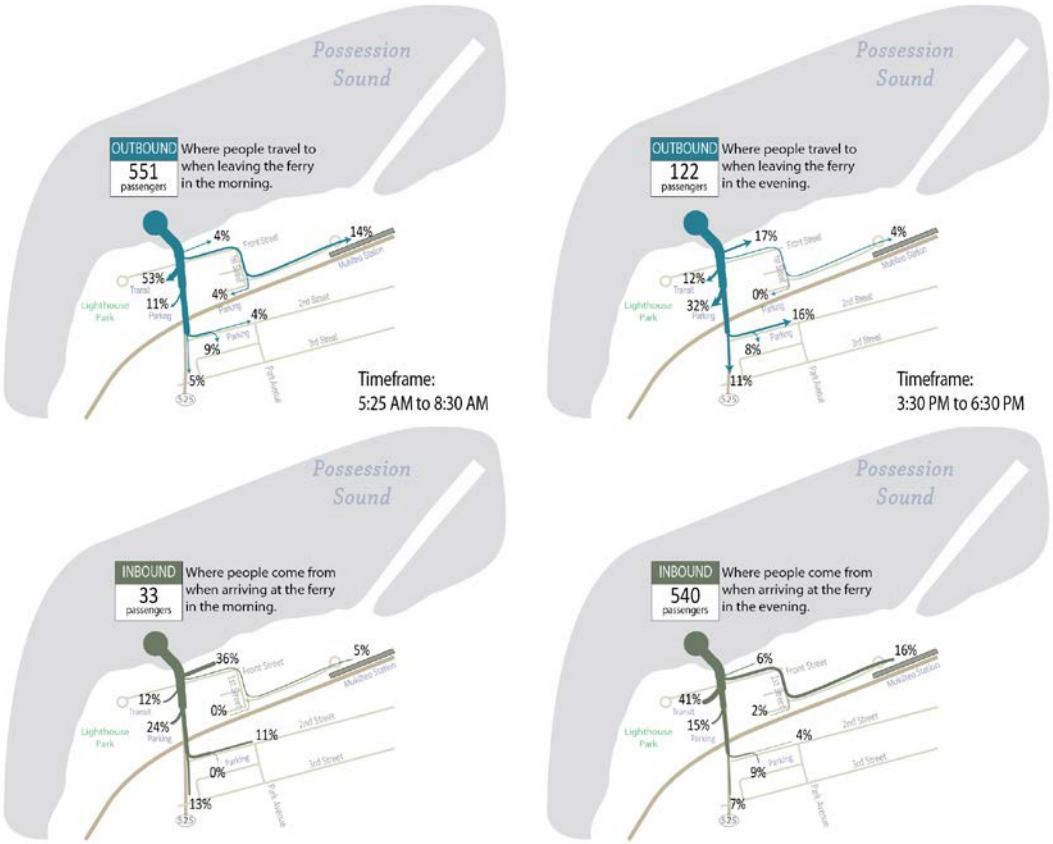
2.3.3 Pedestrian Volumes and Destinations

Pedestrian traffic operations at the Mukilteo ferry terminal were observed in November and December 2010 and normalized for typical monthly activity

(determined to be May, see Section 2.1.3). Pedestrian traffic flows during the morning and evening peak periods are illustrated in Exhibit 2-26. Pedestrians who walk off the ferry prior to vehicles have unrestricted access to cross Front Street. Common destinations include the parking lot behind Diamond Knot Brewery, the bus stop at the SR 525/Front Street intersection, the SR 525 bridge to Mukilteo and to other parking lots, and Mukilteo Station. Some passengers are picked up at the terminal.

The highest pedestrian flows between the Mukilteo ferry terminal and the bus stops occur during peak periods. As shown in Exhibit 2-26, approximately 53 percent of all walk-off traffic in the AM peak period is from the ferry to the bus (compared to 12 percent that walk on), and 41 percent of walk-on traffic in the PM peak period is from the bus to the ferry (compared to 12 percent that walk off).

Exhibit 2-26. Pedestrian Dispersion at Mukilteo Ferry Terminal



2.3.4 Bicycle Facility Conditions

There is limited bicycle use of the ferry terminal; most cyclists leave the Mukilteo ferry terminal in the AM peak period and return to board the ferry in PM peak

period (see Exhibits 2-5 and 2-6). None of the streets to or from the ferry terminal has dedicated bicycle lanes. Cyclists can legally use the same roadway space as motorized vehicles. Cyclists disembarking from the ferry bound for Mukilteo or points to the east must ascend SR 525 in mixed vehicular traffic, sharing the outside travel lane. Some cyclists wait for all vehicles to finish unloading from the ferry before ascending SR 525.

2.3.5 Non-Motorized Safety

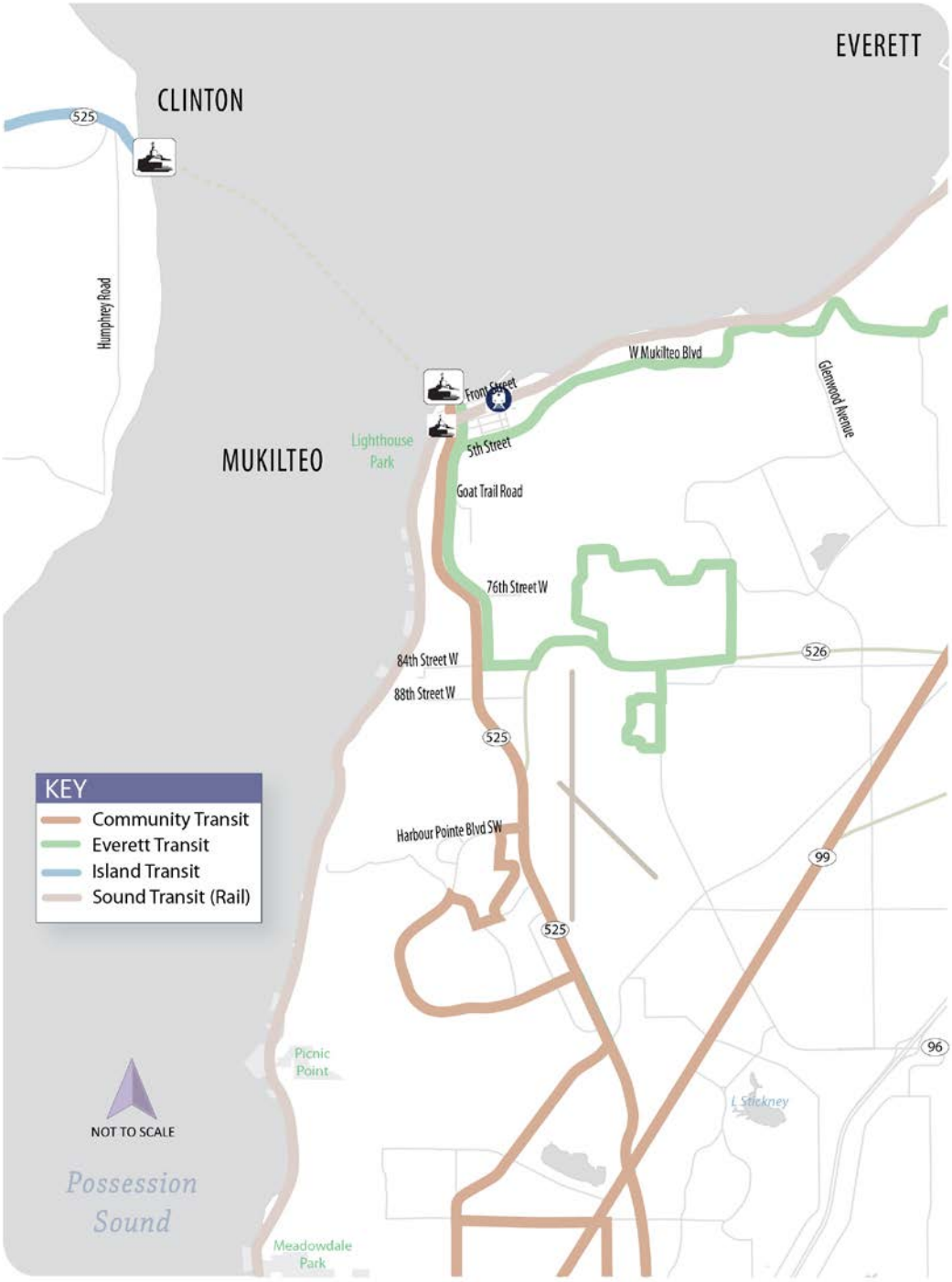
A total of eight collisions involving non-motorized traffic were reported from 2005 to 2009: four at SR 525/Harbour Pointe Boulevard North, two at SR 525/84th Street SW, one at a private driveway north of Goat Trail Road, and one at the SR 525/Sixth Street intersection (refer to Exhibit 2-23 in Section 2.2.4 and Appendix A). The majority of these collisions were the result of the driver failing to yield to a pedestrian while turning right; none of the collisions resulted in a fatality.

2.4 PUBLIC TRANSPORTATION FACILITIES

Community Transit, Everett Transit, Island Transit, and Sound Transit provide transit service in the study area, but only Island Transit operates service on Whidbey Island, serving the Clinton terminal. Sound Transit operates Sounder commuter rail service with a station in Mukilteo. Although Amtrak rail service passes through Mukilteo, it does not stop at the Mukilteo Station. The primary transit corridors in the study area are SR 525, Fifth Street and West Mukilteo Boulevard, SR 526, and the BNSF Railway line. In their *Transit Development Plan* (2012–2017), Community Transit has identified SR 525 as a *transit emphasis corridor*, which is a corridor intended for future service expansion.

Exhibit 2-27 illustrates the service coverage provided by bus and commuter rail service in the study area. Transit service connects the Mukilteo ferry terminal to major destinations such as downtown Seattle, the University District, Lynnwood Transit Center, Everett Station, and Edmonds Community College. Transit service also connects to major employers in the Puget Sound region such as Microsoft, Seattle Children's Hospital, and Boeing.

Exhibit 2-27. Bus and Rail Transit Routes Serving the Mukilteo-Clinton Ferry Route



2.4.1 Transit Serving the Mukilteo Ferry Terminal

Bus service to and from the Mukilteo ferry terminal is operated by Community Transit and Everett Transit, which use a dedicated pull-out bus zone at the Front Street/SR 525 intersection. The Mukilteo Station is located approximately 0.25 mile southeast of the terminal. Exhibit 2-28 lists existing transit service at the Mukilteo ferry terminal by agency, route number, service areas, and weekday schedule frequency; schedule frequency is referred to as headway, which is the scheduled time between buses serving a bus stop. Exhibit 2-29 is a summary of transit ridership (boardings and disembarkings) for the Front Street bus stop by service provider.

Community Transit

Community Transit operates a commuter express bus service during weekday peak commute periods, generally only in the peak direction. For example, Routes 417 and 880/885 operate from Mukilteo to downtown Seattle and the University District, respectively, in the morning and operate in the reverse direction in the evening peak period. Community Transit operates all-day local bus service between the Mukilteo ferry terminal and the Lynnwood Transit Center, including bus service between the Mukilteo ferry terminal and Edmonds Community College during class times.

Vanpool service in Mukilteo is provided by Community Transit; currently, four vanpools serve Redmond (e.g., Microsoft) and Children's Hospital in Seattle. Vanpool participants are responsible for keeping vehicles at their residence and no vanpool parking is provided at the Mukilteo ferry terminal.

Community Transit's Dial-A-Ride Transportation (DART), which is a paratransit service, provides service to the Mukilteo ferry terminal. In 2010, an average of seven trips to and from the terminal were made using DART each month. Paratransit service is a curb-to-curb service for registered, eligible persons with a disability who are unable to use the regular bus service.

Community Transit service restructuring in 2012 resulted in some service reductions at the Mukilteo ferry terminal.

Exhibit 2-28. Existing Transit Service Serving the Mukilteo Ferry Terminal

Transit Agency	Route Number	Schedule Frequency at the Mukilteo Ferry Terminal (minutes)			Service Areas
		AM Peak	Midday	PM Peak	
Community Transit	417	30	no service	30	Mukilteo Ferry Terminal, SR 525, Swamp Creek Park-and-Ride, and Downtown Seattle
	113	30	30	30	Mukilteo Ferry Terminal, SR 525, Harbour Pointe Boulevard North, Beverley Park Road, Swamp Creek Park-and-Ride, Alderwood Mall, and Lynnwood Transit Center
	880/885	30	no service	15-30	Mukilteo Ferry Terminal, SR 525, Swamp Creek Park-and-Ride, Ash Way Park-and-Ride, Lynnwood Transit Center, and University District
Everett Transit	18	30	60	30	Mukilteo Ferry Terminal, West Mukilteo Boulevard, and Everett Station
	70	45–60	no service	45–60	Mukilteo Ferry Terminal, SR 525, SR 526, Boeing Gate 68, Boeing Gate 72, and Boeing Gate 78
Sound Transit	Sounder	30	no service	30	Everett, Mukilteo, Edmonds, and Seattle

Source: Community Transit, Everett Transit, and Sound Transit 2012 Schedules

Note: The 2012 Schedule restructuring eliminated Community Transit's Route 190. The connection to Edmonds Community College can still be made by transferring between other bus routes.

Exhibit 2-29. Transit Ridership Summary for Routes Serving the Mukilteo Ferry Terminal

Transit Agency	Route Number	Annualized Ridership	2009 Average Ridership		
			Weekday	Saturday	Sunday
Community Transit	417	90,000	353	no service	no service
	113	418,100	1,352	859	no service
	880/885	102,050	398	no service	no service
	190	50,510	197	no service	no service
Everett Transit	18	no data	150	35	no service
	70	no data	210	no service	no service
Sound Transit	Sounder	no data	1,070	no service	no service

Source: Community Transit, 2009 Community Transit Annual System Performance Report

Note: The 2012 Schedule restructuring eliminated Community Transit's Route 190. The connection to Edmonds Community College can still be made by transferring between other bus routes.

Everett Transit

Everett Transit operates local bus service, which serves the Mukilteo ferry terminal using a pull-out bus stop located near the Front Street/SR 525 intersection. Route 70 is a commuter bus service connecting the Mukilteo ferry terminal to Boeing and operates for a few hours during the morning and evening commuter periods. Route 70 also provides service to non-Boeing employees who transfer to other routes at the Boeing plant. Most of these riders transfer to Route 3 and Route 8 serving the Seaway Boulevard/Hardeson Road industrial areas.

Everett Transit operates local bus service between the Mukilteo ferry terminal and Everett Station from the morning peak period to the evening peak period; there is no Sunday service. Everett Transit also operates paratransit service. The number of requests (demand) for paratransit service to serve the Mukilteo ferry terminal averages two per month. Everett Transit does not offer vanpool service.

Everett Transit does not anticipate bus system service changes through 2012. Longer-range service changes are anticipated to increase the number of trips scheduled for Route 18 on weekdays and to implement service on Sundays. (Sunday service would be comparable to current Saturday levels of service.)

Sound Transit

Sound Transit operates peak-period Sounder commuter rail service (see Exhibits 2-28 and 2-29) at a station in Mukilteo with connections to Everett, Edmonds, and Seattle. The average weekday boardings in 2008 for Sounder commuter train service between downtown Seattle and Everett were 1,070.

Amtrak

Amtrak provides long-distance intercity rail service. Although Amtrak rail service passes through Mukilteo, it does not stop at the Mukilteo Station.

2.4.2 Transit Serving Clinton Ferry Terminal

Bus transit serving the Clinton ferry terminal is operated by Island Transit, which has one bus stop located at the terminal. Island Transit serves three other bus stops, which connect parking facilities to the Clinton ferry terminal. Patrons of Island Transit can choose to use non-motorized connections from any of these bus stops within walking distance of the Clinton ferry terminal. Exhibit 2-30 summarizes Island Transit service near the Clinton ferry terminal by location, route number, service areas, and weekday schedule frequency. Exhibit 2-31 is a summary of estimated transit ridership (boardings and disembarkings) for Island Transit routes serving the Clinton ferry terminal.

Island Transit

Island Transit operates two types of bus service, which share their service between the Clinton ferry terminal and the park-and-ride lots near the terminal off Humphrey Road and the Deer Lake Road/SR 525 intersection. Island Transit has one commuter express bus service, which is operated between the Clinton ferry terminal and Oak Harbor Station Transfer Center. Commuter express bus service is operated on weekdays during peak commute periods. Unlike typical commuter bus service, Island Transit's Route 1 provides bidirectional express services. Island Transit operates all-day local bus service on Routes 1, 7, and 8, which provide access to communities and destinations across Whidbey Island. Only Route 1 operates on Saturday from the Clinton ferry terminal, and there is no Sunday service. Some local bus routes are "demand stop"; passengers wanting to get off need to ask the driver to stop.

Island Transit provides vanpool services on Whidbey Island. There are currently 104 vanpools with 744 passengers serving areas such as Seattle, Redmond, Bellevue, and Everett. Island Transit vanpools also serve major employers such as Boeing, University of Washington, the U.S. Navy, and Microsoft. Vanpool participants are responsible for keeping vehicles at their residence and no vanpool parking is provided at the Mukilteo ferry terminal. There are currently 36 Island Transit vanpools using the Mukilteo ferry terminal.

Island Transit also operates paratransit service. Island Paratransit is based upon the same days and hours, by route structure, as the regularly scheduled route service. The basic service encompasses a corridor centered on the scheduled route but extends 0.75 mile on either side of the route. Currently, Island Transit will serve ADA-eligible patrons living outside the corridor structure.

Exhibit 2-30. Existing Bus Transit Service Serving the Clinton Ferry Terminal

Bus Stop Location	Route Number	2012 Schedule Frequency at the Mukilteo Ferry Terminal (minutes)			Service Areas
		AM Peak	Midday	PM Peak	
Clinton Ferry Terminal, Humphrey Road, Deer Lake Road	1	60	60	60	Clinton Ferry Terminal, Bayview, South Whidbey State Park, Greenbank, Keystone Terminal (Saturday only), Coupeville Park-and-Ride, and Oak Harbor
	1 Express	20–30	no service	45	Clinton Ferry Terminal, Bayview, Greenbank, Coupeville Park-and-Ride, and Oak Harbor
Clinton Ferry Terminal, Humphrey Road, Deer Lake Road	7	60	60	60	Clinton Ferry Terminal, Langley, Bayview, and Freeland
Clinton Ferry Terminal, Deer Lake Road	8	30–60	120	30–60	Clinton Ferry Terminal, Satchet Head, Maxwelton, Langley, and Bayview

Source: Island Transit 2012 Schedule

Exhibit 2-31. Transit Ridership Summary for Routes Serving the Clinton Terminal

Transit Agency	Route Number	Annualized Ridership	2010 Average Ridership		
			Weekday	Saturday	Sunday
Island Transit	1	183,520	680	185	no service
	7	64,640	250	no service	no service
	8	9,940	40	no service	no service

2.4.3 Source: Island Transit Schedule Alignment

To improve the competitiveness of transit as a mode of choice for travelers, transit agencies attempt to schedule their bus and rail service to match the need at high-demand locations, such as a ferry terminal. Characteristics of transit routes (i.e., route length, roadway congestion, number of buses serving a route) can make it difficult to align transit schedule times with ferry schedule times. Generally, Community Transit, Everett Transit, and Island Transit buses are scheduled to leave or arrive within minutes of ferry arrival and departure times. Because it takes a few minutes for walk-on passengers to walk off the ferry and walk to the bus stop, bus drivers may wait for passengers. On average during the morning peak period, buses are scheduled to leave approximately 12 minutes after ferry arrivals at the Mukilteo ferry terminal.

2.4.4 Average Passenger Loads

Although transit agencies serving the Mukilteo and Clinton ferry terminals constantly strive to match service supply to demand, there is the potential to exceed the available seat and standing capacity on buses—the conditions where the desirable number of passengers per bus is either exceeded or where buses must bypass waiting passengers. A method for measuring average passenger loads is to calculate the load factor, which is the average passenger loads on a bus at any one time during the trip divided by the number of seats. Transit agencies use load factors to assist in planning the number of buses required to service routes.

The average passenger load factor at the Mukilteo and Clinton ferry terminals was calculated from a sample study collected in November 2010. Exhibit 2-32 summarizes the average passenger boardings and disembarkings for buses serving the Mukilteo and Clinton ferry terminals. A load factor of 1.0 indicates all seats on the bus are occupied and a load factor exceeding 1.5 indicates a bus is carrying more than the desirable maximum number of passengers. A larger sample size was not available because Community Transit, Everett Transit, and Island Transit do not regularly collect substantial passenger boarding and disembarking data for every stop. Exhibit 2-33 summarizes the load factors for all observed bus transit routes.

Mukilteo Ferry Terminal

None of the buses serving the Mukilteo ferry terminal was overloaded and all bus patrons were able to be seated. Because buses begin their route at the Mukilteo ferry terminal, the bus stop will not be skipped due to overloading. Buses serving the Mukilteo ferry terminal operated by Community Transit and Everett Transit have a desired maximum number of passengers of 40 for 40-foot-long buses and 60 for 60-foot-long buses (i.e., Routes 417 and 880). The highest observed load factor was 0.48 for Everett Transit Route 70 in the AM peak period, which had an average of 29 boardings per bus. All other buses for both the AM peak period and PM peak period had observed load factors of less than 0.20.

Exhibit 2-32. Average Boardings and Disembarkings for Transit Service

		Morning Peak Period		Evening Peak Period	
Transit Agency	Route Number	Leaving Terminal	Arriving at Terminal	Leaving Terminal	Arriving at Terminal
Community Transit	417	11.2			7.5
	113	3.1	0.4	1.0	3.7
	880	4.4			4.3
	190	4.0			2.7
Everett Transit	18	5.7	0.4	1.0	5.3
	70	29.0			
Sound Transit	Sounder	15.3	1.3	2.0	17.3
Island Transit	1	3.0	25.7[a]	26.4[a]	2.5
	7	2.5	15.9	8.2	1.8
	8		7.7	9.0	

[a] Observed buses with loads exceeding 40 passengers, which indicates some patrons were required to stand.
Source: 2010 Field Data

Exhibit 2-33. Average Load Factors

Transit Agency	Route Number	Morning Load Factors		Evening Load Factors	
		Leaving Terminal	Arriving at Terminal	Leaving Terminal	Arriving at Terminal
Community Transit	417	0.12			0.08
	113	0.05	0.01	0.02	0.06
	880	0.05			0.05
	190	0.07			0.04
Everett Transit	18	0.09	0.01	0.02	0.09
	70	0.48			
Island Transit	1	0.05	0.43	0.44	0.04
	7	0.04	0.26	0.14	0.03
	8		0.13	0.15	

Source: 2010 Field Data

Clinton Ferry Terminal

Island Transit Route 1 had a maximum observed load factor of 0.44, and some buses experienced passenger loads exceeding the available bus seat capacity of 40 passengers; buses serving the Clinton ferry terminal operated by Island Transit have a desired maximum of 60 passengers. Routes 7 and 8 had no observed overloading. The average passenger load for Route 1 traveling to the Clinton ferry terminal in the morning and leaving the Clinton ferry terminal in the PM peak period was approximately 26 passengers. Routes 7 and 8 had average load factors of 0.26 or less.

2.4.5 Operating Issues and Performance

Issues Identified by Operating Agency Staff

Bus service can be affected by events, construction, unusual and unexpectedly high traffic volumes, and delays due to late ferry arrivals and ferry operations.

Everett Transit and Community Transit have reported that transit buses regularly encounter bus zone capacity deficiencies. The primary bus zone, on southbound SR 525, just south of Front Street, accommodates only two buses at a time. Because six routes terminate at the Mukilteo ferry terminal and fare payment causes long wait times, arriving buses must proceed to the Mukilteo Lighthouse Park to turn around,

which is not a preferred location by the transit agencies or the City of Mukilteo. Furthermore, buses cannot turn around at the park during market days; moreover, when future phases of the park are completed, Mukilteo has reported that transit buses may no longer be able to use the park.

Queuing within the SR 525/Front Street intersection is an issue, because westbound buses along Front Street making a left turn into the primary bus zone must stay east of the bus stop pole/flag. This can block the SR 525/Front Street intersection when the bus zone is occupied. Another challenge for buses is accessing the bus zone because eastbound vehicles on Front Street can queue during ferry loading and unloading and block buses from accessing the bus zone. The transit agencies have also identified the tight left-turn turning radii as problematic, as evidenced by the broken curb on the northwest corner of the SR 525/Front Street intersection.

Buses at the Mukilteo ferry terminal accessing the bus stop can be delayed by vehicles being unloaded from the ferry. The delay buses encounter during ferry operations can range from 2 to 5 minutes, depending on the number of vehicles being unloaded from the ferry.

2.4.6 Public Transportation Safety

Safety issues related to transit most often consist of two components:

- Potential vehicle-to-pedestrian (or bicyclist) collisions while traveling to and from transit facilities (e.g., bus stops and train stations).
- Potential for criminal activity while waiting for transit.

The first component listed above is addressed in *Section 2.1.9* (*Mukilteo Ferry Terminal Facility Safety*) because this project's potential effect on safety is limited to the vicinity of the ferry terminal.

For the second component, adequate lighting around transit facilities is implemented, in part, to discourage criminal activity. Specific to this terminal, several WSDOT personnel are located at the ferry terminal and proximate to the bus stop and Mukilteo Station areas, which could further deter criminal activity in addition to the lighting features provided.

During 2009, the Mukilteo ferry terminal had two days where some sailings were cancelled due to suspicious activity. Since 2006, there have been 29 events reported for customer behavior, disorderly conduct, driving under the influence, suspicious behavior and packages, and other security concerns.

2.5 PASSENGER LOADING AREAS

The passenger loading area refers to the location where pedestrians wait to board the ferry and where they walk when disembarking.

2.5.1 Location

The existing Mukilteo ferry terminal has one passenger loading area located in the northwest corner of the SR 525/Front Street intersection. The passenger loading area also serves as the drop-off area for many commuters. As drivers approach Front Street from SR 525, they are allowed to either turn left or right to drop off ferry walk-on passengers. Then they turn around using on-street or off-street parking areas and leave the ferry terminal area on SR 525. A small ramp provides the final connection between the loading area and the ferry. The incline of this ramp varies with the tide levels and currently poses challenges to individuals in wheelchairs and with strollers. Although these incline challenges do not preclude walking on or off the ferry, the incline is not desirable and increases pedestrian travel times.

2.5.2 Passenger Loading Area Safety

Potential safety issues at the passenger loading area are similar to those described above in *Section 2.4.6*. Positioning appropriate lighting and WSDOT staff around the passenger loading area deters criminal activity.

2.6 PARKING

Because the ferry vehicle capacity is reached during peak periods, ferry passengers have adjusted their travel patterns to make use of available park-and-ride lot facilities on one or both ends of the Mukilteo-Clinton ferry route. Some Whidbey Island commuters use park-and-ride facilities to get to the ferry in Clinton (or use other means such as taking transit, walking, or being dropped off) and others leave a car in an overnight parking area in Mukilteo, boarding the ferry on foot.

2.6.1 Mukilteo

Near the Mukilteo ferry terminal, parking for various uses is provided at a number of locations, including on-street parking spaces, off-street parking lots that are for public or paid use, ferry employee parking, and dedicated South Transit parking for Sounder commuter rail. Exhibits 2-34 and 2-35 show the number and type of parking spaces in the Mukilteo ferry terminal vicinity.

Exhibit 2-34. Designated Parking Areas near the Mukilteo Ferry Terminal

Exhibit 2-35. Existing Parking at Mukilteo

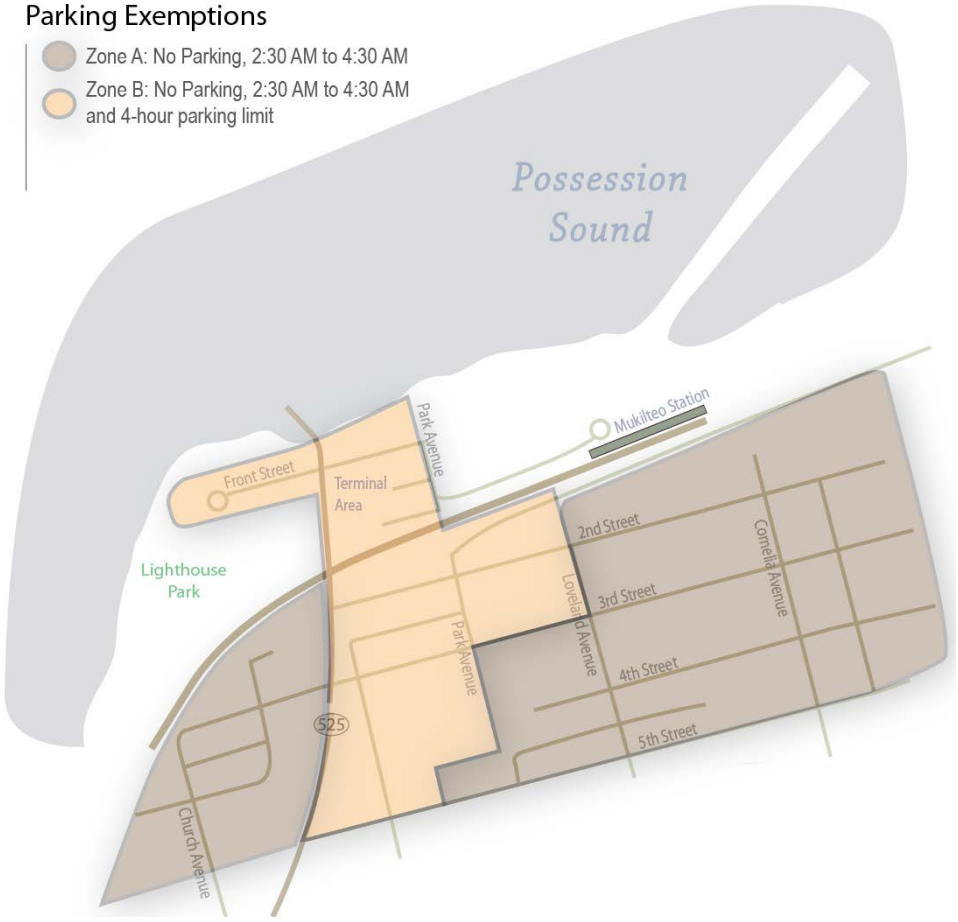
		Existing Parking at Mukilteo	
PARKING LOT	Parking Location		Notes
A	Southwest corner of SR 525 and Front Street	98	Off-Street private lot / paid (total does not include 5 vendor and 6 unmarked stalls)
B	Second Street between SR 525 and Park Avenue	40	Off-Street private lot / paid
C	Former Buzz Inn property (southwest corner of Front Street and Park Avenue)	n/a	This 45-space lot for Ivar's Mukilteo Landing is not included in totals because its use would be displaced
D	Port of Everett Mount Baker Terminal	30	Combined Port of Everett and public lot
E	Mukilteo Station Parking	63	Sound Transit park-and-ride lot
	Subtotal	231	
ON-STREET			
F	First Street between SR 525 and Park Avenue	25	On-street / time restrictions / parking passes
G	Park Avenue between Front Street and First Street	18	On-street / time restrictions / parking passes
H	Front Street between SR 525 and Park Avenue	26	On-street / time restrictions / parking passes
	Subtotal	69	
	Total Parking Lot and On-Street Parking Spaces	**300**	
WSF PARKING			
I	WSF employee parking (west of SR 525)	20	
J	WSF employee parking (at Mukilteo ferry terminal)	23	WSF employees only
	Subtotal	43	WSF employees only

A parking study was conducted on December 15, 2010 near the Mukilteo ferry terminal to report on parking utilization. This study found that approximately 16 to 48 percent of parking lot A, 31 to 46 percent of parking lot B, and 63 percent of parking lot F are occupied during a typical weekday. Ferry passengers were observed using these lots.

On-street parking near the Mukilteo ferry terminal is regulated by two residential parking zones as illustrated in Exhibit 2-36; parking permits are available to residents of Mukilteo but not available to ferry commuters. Resident Zone A permit holders are exempt from the no parking restriction from 2:30 AM to 4:30 AM and Resident Zone B permit holders are exempt from the no parking restriction from 2:30 AM to 4:30 AM and the 4-hour parking limit. The 4-hour time limit discourages commuter traffic and these parking stalls are typically used by local business patrons.

The public parking area located in the southwest corner of the Front Street/Park Avenue intersection (Lot C) is reserved for Ivar's restaurant patrons. On-street parking on First Street east of Park Avenue (Lot E) is restricted to Mukilteo Station patrons.

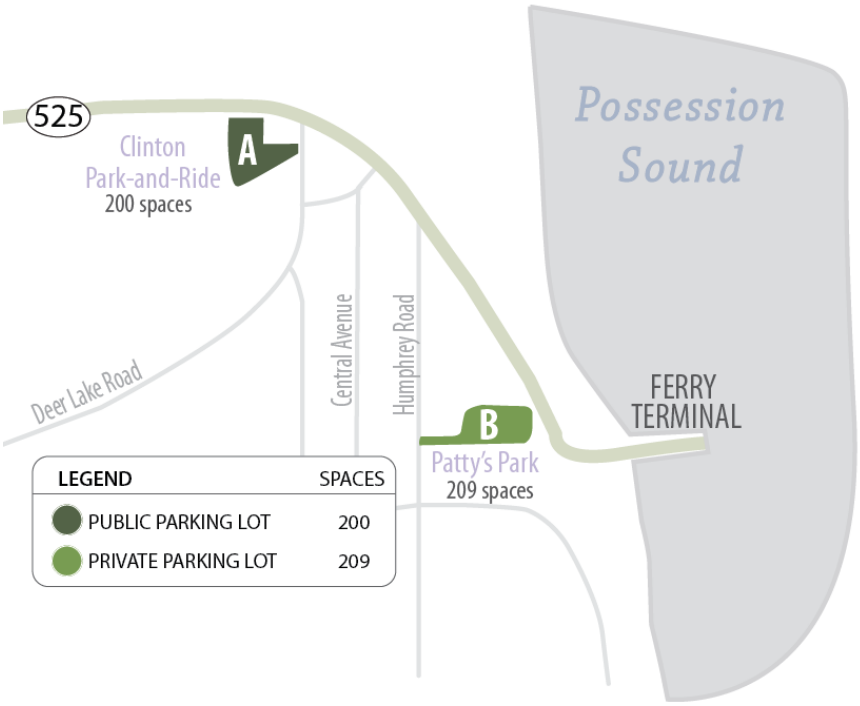
Exhibit 2-36. Residential Parking Zones in Mukilteo



2.6.2 Clinton

Near the Clinton ferry terminal, a private parking area (Patty's Park) for ferry traffic is provided on the west side of SR 525 (above the bluff) and is accessed from Humphrey Road (Exhibit 2-37). This parking area (Parking Area D) has 209 stalls in total; 109 stalls require a monthly permit and the remaining 100 stalls can be paid for on an hourly basis. The November 10, 2010, parking study showed a 35 percent to 41 percent utilization rate. This parking area is not specifically reserved for ferry traffic; however, the lack of connecting transit and residential land uses surrounding the parking area make non-ferry traffic parking unlikely. The non-motorized field data collection effort on November 17 and 18, 2010, also observed that all of the commuters in Parking Area D continued towards the ferry, which substantiates the assumption that this lot is primarily used by ferry traffic.

Exhibit 2-37. Designated Parking Areas near the Clinton Ferry Terminal



For off-site parking in Clinton, most ferry-related traffic uses the Clinton Park-and-Ride lot in the southwest corner of the SR 525/Deer Lake Road intersection (Parking Area E). This park-and-ride lot is free of charge, has 200 parking stalls, and provides transit connections to Island Transit bus Routes 1, 7, and 8. With frequent service between the park-and-ride lot and the ferry terminal, this location serves the majority of off-site parking demand for the ferry. The November 10, 2010, parking study showed a 110 percent utilization rate. There are other park-and-ride lots on Whidbey Island that provide access to transit serving the Clinton ferry terminal. The Bayview, Freeland, Coupeville Prairie Station, and Greenbank Park-and-Rides provide another 223 parking stalls, which

are approximately 68 percent occupied during a normal weekday; the 85 parking stalls at the Bayview Park-and-Ride are usually 100 percent occupied.

2.6.3 Parking Safety

Safety issues within parking areas largely consist of parking area design and lighting, both of which are design characteristics. Additionally, because collisions within parking areas are typically less severe, many collisions within parking areas are not reported and little data are available.

On-street parking along residential streets has the potential to affect collision frequency; however, collisions along these roadways historically have not been a concern. It would be difficult to separately identify ferry-related and non-ferry-related collisions in any collision data for these roadways.

2.7 FREIGHT

2.7.1 Rail Operations

The BNSF Railway mainline runs generally along the eastern edge of Puget Sound and passes through the project area. This railway connects Seattle to British Columbia, Canada. Amtrak passenger rail and Sounder commuter rail share this railway with freight service. Only Sounder service stops at Mukilteo Station. Nearby Amtrak stations are located in Seattle, Edmonds, and Everett. The Port of Everett Mount Baker Terminal is located to the east of the Mukilteo ferry terminal.

2.7.2 Truck Freight

Truck freight uses multiple roadways in the study area, most notably SR 525. Between 4 million and 10 million metric tons per year are carried on the SR 525 corridor.

2.7.3 Airports

There are no major airports in the study area. Airports near the study area provide limited commuter service, such as Paine Field. A number of businesses around Paine Field, such as Boeing, have employees, patrons, and freight cargo passing through the study area using roadways and transit service.

2.7.4 Freight Safety

Potential safety issues related to freight are similar to those described above in Sections 2.1 and 2.2. However, freight vehicles typically require a larger area to complete turns, and the existing terminal site layout requires two turns to board the ferry (a left turn onto Front Street and a right turn onto SR 525/transfer span and into the ferry). This potential safety issue, however, is mitigated by the

position and sequencing of boarding larger vehicles. When larger-sized vehicles are allowed to board from lanes 4, 5, and 6, lanes 1 through 3 have already boarded and therefore there are no vehicles on the left side of the larger-sized vehicle that could conflict with the left turn onto Front Street. As the larger-sized vehicle turns right onto the SR 525/transfer span, all other cross street traffic is stopped, thereby minimizing the risk for vehicle-to-vehicle conflict. As a result, while wide-turning larger-sized vehicles create an increased potential for vehicle-to-vehicle collisions, the risk is very low due to the ferry boarding patterns.

3 TRANSPORTATION EFFECTS

This chapter summarizes the transportation effects within the study area corridor along SR 525 and at the potential ferry terminal locations in Mukilteo.

The project is considering four alternatives:

- *No-Build*, as required under the National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA), which maintains the existing facility but does not improve it and provides a basis against which to compare the effects of the Build alternatives.
- *Preferred Alternative*, which would relocate the terminal and multimodal center in the western portion of the Mukilteo Tank Farm and remove the existing terminal.
- *Existing Site Improvements*, which would construct an improved multimodal facility largely at the existing ferry terminal site on the Mukilteo waterfront.
- *Elliot Point 1*, which would relocate the terminal in the eastern portion of the Mukilteo Tank Farm as part of an integrated multimodal facility and remove the existing terminal.

This chapter describes the project's impacts on the existing motorized and non-motorized network, bus and rail operations, parking, ferry terminal operations and scheduling, multimodal connections, and freight operations. It summarizes the analysis year (2040) traffic volumes and ferry ridership and assesses roadway and non-motorized network performance.

No roadway or terminal improvements are planned for the Clinton ferry terminal as part of this project, although indirect effects from the increased ferry ridership on parking and transit ridership on Whidbey Island are addressed.

3.1 PROPOSED ALTERNATIVES

This section provides a summary of the proposed alternatives considered for evaluation. Subsequent sections include a comparative analysis among the alternatives for the multimodal components including the terminal facility; the roadway network; non-motorized characteristics; public transportation access and service; passenger loading; employee, ferry, and Sound Transit parking; and freight.

3.1.1 No-Build Alternative

The No-Build Alternative provides a baseline against which to compare the effects of the Build alternatives. It includes what would be needed to maintain the existing ferry terminal at a functional level. Maintenance and structure replacements would occur in accordance with legislative direction to maintain and preserve ferry facilities, but WSDOT would make no major investments for improvements. Exhibit 3-1 illustrates the planned maintenance and preservation activities currently assumed.

Nearly all of the ferry docking, loading, and unloading facilities would need to be replaced because they will have reached the end of their lifespan by 2040. The existing vehicle holding area would remain at its current location. The terminal supervisor's building, passenger and maintenance building, and the three existing toll booths would be replaced at their current locations. This alternative would not improve substandard conditions related to congestion, vehicular and pedestrian conflicts, poor sight distance, and security.

Figure 3-1. **No-Build Alternative**

3.1.2 Preferred Alternative

The Preferred Alternative is a slightly modified version of the Elliot Point 2 Alternative that was studied in the Draft EIS. This alternative would develop the project on the western portion of the Mukilteo Tank Farm(Figure 3-2). The existing ferry berth and all of its marine structures would be removed, including the Port of Everett fishing pier and day moorage. The Preferred Alternative would reconstruct the fishing pier and day moorage as part of the new multimodal facility.

A new passenger building and a maintenance building would be combined as a two-story building and aligned parallel to the shoreline. The building would bridge over the vehicle driveway to the ferry trestle, and an overhead passenger loading ramp would connect to the second story of the building.

The new vehicle holding area would have the holding capacity for up to 266 vehicles and the current vehicle holding area would be vacated. The holding area was expanded to reduce the typical queues extending onto SR 525, compared to the Elliot Point 2 design used for the Draft EIS. Four new toll booths would be located west of the vehicle holding area.

To access the multimodal facility, First Street would be realigned and extended as a four-lane roadway beginning on a retained fill structure at a new signalized intersection with SR 525. The First Street improvements would reconstruct the intersection with Park Avenue. The roadway would descend to near the existing grade at Front Street, and continue to a signalized entrance to the new ferry terminal. First Street then continues as a two-lane road to a new bus transit and paratransit facility and the Mount Baker crossing at the east end of the site. One section of the roadway approaching the transit center would have an additional lane for transit layover. The new transit center would have six bus bays and an area for passenger drop-off and pick-up. The transit facility also would include an area for ferry employee parking.

The Preferred Alternative modifies the access road to the Mukilteo Station and its parking, which would also be between the BNSF railroad and the new First Street extension. The alternative also develops a public parking area between the BNSF railroad and the new First Street, near SR 525, to replace displaced street parking. This would require cutting into the existing hillside and building a retaining wall parallel to the railroad.

Sidewalks and bicycle lanes would be provided along the First Street extension. A pedestrian walkway would be built along the edge of the terminal from First Street to a shoreline promenade located west of the ferry slip. Other sidewalks would link the Mukilteo Station and the transit center, which would also have relocated commuter rail parking and a shoreline promenade. The Preferred Alternative would include new security fences and gates surrounding the holding area and terminal.

Figure 3-2. **Preferred Alternative (Elliot Point 2)**

3.1.3 Existing Site Improvements Alternative

The Existing Site Improvements Alternative would construct an improved multimodal facility by replacing the existing Mukilteo ferry terminal with an expanded terminal on and around the current site. Its key features are shown on Exhibit 3-3.

All of the existing ferry facility marine and upland features would be replaced. The ferry dock and trestle would be rebuilt facing due north to provide a straighter alignment with SR 525. The Port of Everett fishing pier and seasonal day moorage would be would be removed and need to be relocated.

The existing vehicle holding area would remain at the same general location and would still store approximately 216 vehicles, the equivalent of one-and-one-half 144-vehicle vessels. Toll booths and a supervisor's building would be constructed nearby. A new passenger and maintenance building would be constructed east of the ferry access driveway expanding into areas currently occupied by other uses. Overhead passenger loading ramps would connect to the second story of the new passenger building.

Front Street and Park Avenue would become one-way streets, and First Street would be extended west to a new signalized intersection with SR 525. A new transit center would be constructed east of the vehicle holding lanes, combined with a parking area for ferry employees. Paratransit parking would be provided on Front Street near the passenger building.

Figure 3-3. **Existing Site Improvements Alternative**

3.1.4 Elliot Point 1 Alternative

The Elliot Point 1 Alternative would develop the Mukilteo Multimodal Project on the eastern portion of the Mukilteo Tank Farm. Its key features are shown on Exhibit 3-4.

Because the shoreline slopes more gradually in this location, the ferry slip would need to be located about 250 feet offshore, which would require a longer pier and trestle. A new passenger building and a maintenance building would be located over water on the new concrete trestle; this shortens walk distances and allows the nearby shoreline area to be developed for open space and stream restoration purposes. An overhead passenger loading ramp would connect to the second story of the new passenger building.

The Tank Farm Pier would be removed. WSDOT would remove the existing ferry terminal, including buildings and marine structures, and the Port of Everett fishing pier and day moorage at the current terminal site would be relocated. The current vehicle holding area would be vacated.

This alternative would also provide parking for commuter rail, the Mount Baker Terminal shoreline access area, and ferry employees. The alternative includes tollbooths, ferry vehicle holding areas, and shoreline promenades on each side of the new ferry dock. Japanese Creek, which currently runs in a pipe culvert below the Mukilteo Tank Farm, would be restored to an open stream north of the extended First Street, with a 50-foot buffer on either side. The stream would be crossed by a pedestrian bridge near the shoreline. New lighting would illuminate First Street and the terminal facilities, including the vehicle holding areas.

The vehicle holding areas would have capacity for approximately 216 vehicles. A terminal supervisor's building would be constructed above four new toll booths east of the holding area. New lighting would illuminate First Street and the terminal facilities, including the vehicle holding areas.

First Street would be realigned and extended as a four-lane roadway from SR 525 to the Mount Baker Terminal, with sidewalks and bicycle lanes. A new signalized intersection with SR 525 would be constructed. A rebuilt First Street/Park Avenue intersection would provide access to a reconfigured parking and access area for Mukilteo Station.

A new transit center with six bus bays would be west of the new terminal. Access and parking for Mukilteo Station would be configured to connect to the First Street extension. New security fences and gates would secure the holding and terminal area during periods of heightened security, as required by the U.S. Coast Guard.

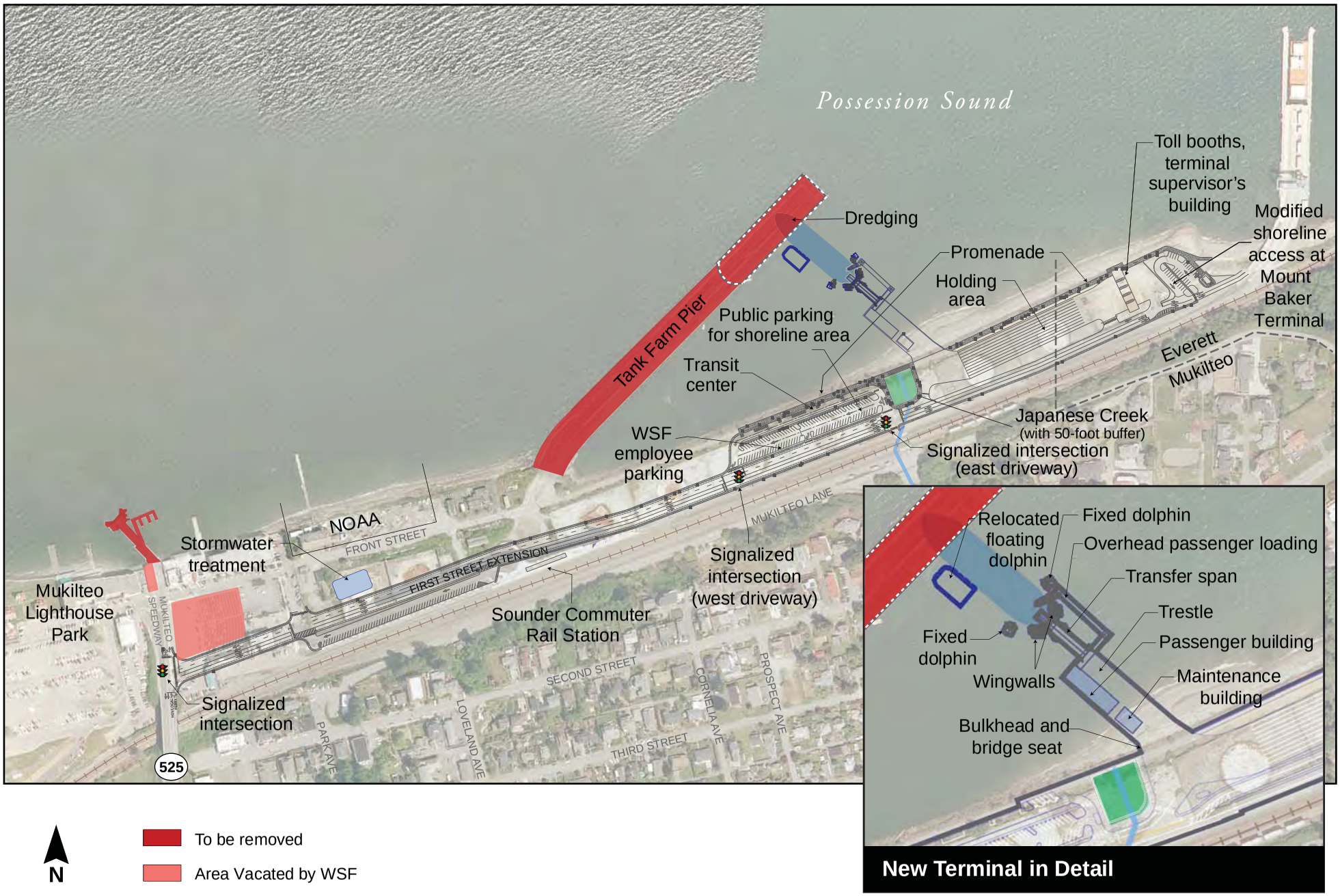


Figure 3-4. **Elliot Point 1 Alternative**

3.2 DEVELOPMENT OF THE TRAVEL FORECASTS

Travel forecasts are an estimation of how many people will travel in a future year and how those people will choose to travel. These forecasts provide insight into how travel demand grows or changes given future land use assumptions, transportation investments, and capacity constraints for the roadway and public transportation systems.

To develop travel forecasts for a roadway and ferry network, two demand models were used:

1. *WSDOT Ferries Division Final Long-Range Plan* 2030 model, which was used to determine ferry ridership and distribution of ferry passengers.
2. PSRC's 2040 Regional model, which was used to determine traffic forecasts for the state and regional roadway network.

It was necessary to use both models and compile their results into a single forecast because each model is better for forecasting the use (ferry system or roadway system) for which it was designed. A more detailed description of the travel forecasting methodology and process is provided in the *Transportation Methods and Assumptions Technical Memorandum* (see Appendix B).

3.2.1 Travel Demand Model Overview

Travel demand models estimate the number of trips, origin and destinations of trips, mode of travel, and selection of routes people make on a day-to-day basis based on land use, trip behavior, and the transportation network. The travel demand models used to develop the forecasts follow a standard four-step process:

1. **Trip generation** is based upon land use and socioeconomic travel behavior. This step determines the demand for travel that can be expected from a variety of land use types, such as housing, shopping, or employment.
2. **Trip distribution** matches trip origins with trip destinations, determining the proportion of trips made from one area to another.
3. **Mode choice model** determines the probability that previously generated and distributed trips are made by one mode versus another. The models take into account many trip factors such as travel time and cost and are built upon travel surveys.
4. **Route assignment** takes the mode choice probabilities generated in Step 3 and routes the trips via the transportation network from their origin to their destination.

For the four-step process, Steps 2 through 4 are repeated multiple times to balance the trips over the transportation network. Models are generally intended to reflect

these patterns during a normal peak period (the WSF model reflects a 4-hour period from 3:00 PM to 7:00 PM).

3.2.2 Forecast Methodology

Two travel models were used to develop the travel forecasts for the transportation assessment. Because the *WSDOT Ferries Division Final Long-Range Plan* and PSRC *Transportation 2040* models were each created for a specific purpose, both models were required to estimate future travel patterns. The WSF model includes a large geographic area, which captures travel outside the geographic limits of the PSRC model. Additionally, the WSF model has a more detailed and refined travel behavior and tolling model for each ferry crossing throughout Western Washington; moreover, it is consistent with the *WSDOT Ferries Division Final Long-Range Plan*. The PSRC model includes the land use and transportation investments assumed in *Vision 2040* and *Transportation 2040,* and the model is specifically calibrated for the state highway system and regional roadway network. Applying both of these models to the forecasting process helps to maintain consistency with PSRC's *Vision 2040* and *Transportation 2040* and the *WSDOT Ferries Division Final Long-Range Plan*.

One set of future travel demand volumes was developed for all 2040 alternatives because the change in the multimodal connections for each alternative is not anticipated to change the total number of people traveling and how they choose to travel.

The base year for this analysis is 2010 with a horizon year of 2040. Model inputs for 2010 are based on seasonally adjusted traffic counts and WSF fare box receipts, as well as transit, park-and-ride, pedestrian, and bicycle traffic counts conducted at the Mukilteo ferry terminal. Turning movement counts at study intersections were provided by WSDOT. To accurately reflect vehicle queuing behavior, data were collected on a per-sailing basis.

The focus of the WSF model was to develop ferry ridership volumes for the 4-hour weekday PM peak period (3:00 PM to 7:00 PM) in both the southbound and northbound directions. The base model month was May, which is used by WSF as an average travel month, and is consistent with the *WSDOT Ferries Division Final Long-Range Plan*. When evaluating seasonal variations throughout the year, January is considered the lowest travel month and August is the highest travel month. Daily ridership volumes were based on conversion factors created by evaluating the three seasonal time periods.

3.2.3 Transportation Forecasting Assumptions

The transportation forecasting process for this project assumed additional transportation services and infrastructure would be in place by 2040. These anticipated investments identified in *Transportation 2040* can be separated into two groups:

1. Investments affecting ferry ridership.
2. Investments affecting transit and roadway facilities.

These two groups correspond with the different models used to develop the travel forecasts. Exhibits 3-5 and 3-6 summarize the investments within the study area by the type of project and whether or not the project was included as a model assumption.

The replacement of the two existing 124-vehicle ferries providing service on the Mukilteo-Clinton route with two 144-vehicle ferries was an important assumption in the travel forecasting process. The new ferries would carry approximately 20 more vehicles per sailing. The *WSDOT Ferries Division Long-Range Plan* identifies the first replacement ferry to enter service in the 2013-2025 timeframe with the second ferry entering service in the 2025-2031 timeframe. With sailings every 30 minutes, cross-Sound vehicle capacity on ferries is increased by approximately 40 vehicles per hour per direction.

Exhibit 3-5 summarizes the transit investments that were assumed in the model, which could affect ferry ridership. The investments consist of improved bus service, higher capacity Sound Transit Sounder commuter rail service, as well as the extension of Link light rail from the Northgate Transit Center to the Lynnwood Transit Center.

Exhibit 3-6 summarizes investments affecting transit and roadway facilities, including widening projects on state routes and local arterial roadways. Several projects within the Mukilteo ferry terminal area were not included as part of the assumptions because they have uncertain funding sources and unknown environmental impacts, or are not possible or necessary with all alternatives. For example, two projects not included in the forecasting assumptions are a new three-lane connection between SR 525 and the ferry terminal and signal and traffic improvements to reduce the effects of queuing vehicles on SR 525 because they are represented in the Build alternatives. Also, a proposed 130-stall parking garage at Mukilteo Station was not included and is addressed in *Chapter 6 Cumulative Impacts*.

Exhibit 3-5. Transportation Investments Potentially Affecting Ferry Ridership

Project Title	Project Location	Limits	Description	Lead Agency	Included in Forecasting Assumptions
Bicycle and Pedestrian Investments					
Mukilteo Lane Waterfront Access	Mukilteo Lane	Park Avenue to Mt. Baker Crossing	Construct parking lot and pedestrian access bridge connection to the ferry terminal.	City of Mukilteo	No
Transit Service and Ferry-Related Investments					
Enhanced Sounder Service	BNSF Railway Corridor	Seattle to Everett	Passenger capacity on the Sounder was unconstrained, reflecting ability to add additional cars to existing train departures if necessary	Sound Transit	Yes
Mukilteo-Clinton Vessel Replacement Program	Mukilteo-Clinto n crossing	Mukilteo-Clinton	Replacement of both 124-vehicle ferries with 144-vehicle ferries	WSF	Yes
Core or Swift Bus Rapid Transit (BRT)0	Airport Road, 128th, 132nd, Cathcart Way	SR 526 to SR 9	Core Service or Swift BRT. Requires speed and reliability improvements and accessible transit stops.	Agency Not Identified	Yes
Core or BRT	Mukilteo Speedway (SR 525)	Mukilteo Ferry to I-405	Core Service or BRT. Requires speed and reliability improvements and accessible transit stops.	Agency Not Identified	Yes
Core or BRT	SR 525	I-5 to SR 526	Core Service or BRT. Requires speed and reliability improvements and accessible transit stops.	Agency Not Identified	Yes
Parking at Mukilteo Station	First Street east of SR 525	n/a	Sound Transit and the City of Mukilteo are studying options for expanding parking.	Sound Transit	No
Link Light Rail Extension from Northgate Transit Center to Lynnwood Transit Center	I-5	Link Northgate Station to Lynnwood Transit Center	Extension of Link light rail with stations at 145th, 185th, and 236th Streets	Sound Transit	Yes

Source: Transportation 2040, Appendix M: Itemized Investment List (PSRC 2010); WSDOT 2009 Final Long-Range Plan, Appendix N: Proposed Vessel Assignments

Exhibit 3-6. Transportation Investments Affecting Transit and Roadways Facilities

Project Title	Project Location	Limits	Description	Lead Agency	Included in Forecasting Assumptions
Transit Facilities and Ferry-Related Investments					
Transit Priority Infrastructure for Core or Swift BRT	Airport Road, 128th Street, 132nd Street, Cathcart Way	SR 526 to SR 9	Transit priority infrastructure for Core or Swift BRT. May include business access and transit (BAT) lanes, signal priority, stations, queue jumps, etc.	Agency Not Identified	Yes
Transit Priority Infrastructure for Core or BRT	Mukilteo Speedway (SR 525)	Mukilteo Ferry to I-405	Transit priority infrastructure for Core or BRT. May include BAT lanes, signal priority, stations, queue jumps, etc.	Agency Not Identified	Yes
Transit Priority Infrastructure for Core or BRT	SR 525	I-5 to SR 526	Transit priority infrastructure for Core or BRT. May include BAT lanes, signal priority, stations, queue jumps, etc.	Agency Not Identified	Yes
State Route Roadway-Related Investments					
SR 99/Evergreen Way	SR 99/Evergreen Way	115th Street to Airport Road	Widen Evergreen Way from five to seven lanes, with curb, gutters, and sidewalks, and drainage improvements.	City of Everett	Yes
SR 99/Evergreen Way Transit High-Occupancy Vehicle (HOV) Treatments	SR 99/Evergreen Way	148th Street SW to 46th Street	Construct BAT lanes on Evergreen Way/Highway 99.	City of Everett	Yes
SR 525	SR 525	SR 526 to Mukilteo Multimodal Terminal	Develop a new three-lane roadway on new alignment that would access the relocated Mukilteo ferry terminal.	WSDOT	No
Arterial Roadway-Related Investments					
112th Street – Beverly Park Road Corridor	112th Street	SR 527 to SR 525	Widen from two or three lanes to five lanes with sidewalks and bicycle lanes on both sides in six phases.	City of Everett	Yes
112th Street SW/ Beverly Edmonds Road	Beverly Park Road	Airport Road to SR 525	Improve to five lanes with bicycle lanes	Snohomish County	Yes
Ferry Holding Lanes	Mukilteo Ferry Terminal	n/a	Mitigation measure for traffic congestion associated with ferry traffic backup on SR 525. Options include off-street storage, traffic warning measures, and signals at Fifth Street, Goat Trail Road, 76th Street SW, and 84th Street SW.	City of Mukilteo	No

Source: Transportation 2040, Appendix M: Itemized Investment List (PSRC, October 2010)

3.3 MUKILTEO FERRY TERMINAL

The following section compares the elements related to the operation of the Mukilteo ferry terminal for the No-Build and Build alternatives. WSF plans to continue operating ferry service connecting Mukilteo to Clinton as part of the

SR 525 corridor, as opposed to another location such as Edmonds or Everett. Overhead loading is anticipated to be needed after 2030 and is assumed to be provided for all Build alternatives.

3.3.1 Sailings and Scheduling

For all alternatives, daily ferry service would continue, and sailing time between Mukilteo and Clinton would remain approximately 15 minutes each way. Relocating the ferry terminal for the Preferred and Elliot Point 1 alternatives would not affect ferry scheduling for the Mukilteo-Clinton route (see Section 3.3.7). The service would be provided by two ferries, which would accommodate more vehicles than the existing ferries serving this route.

3.3.2 Ferry Ridership Forecasts

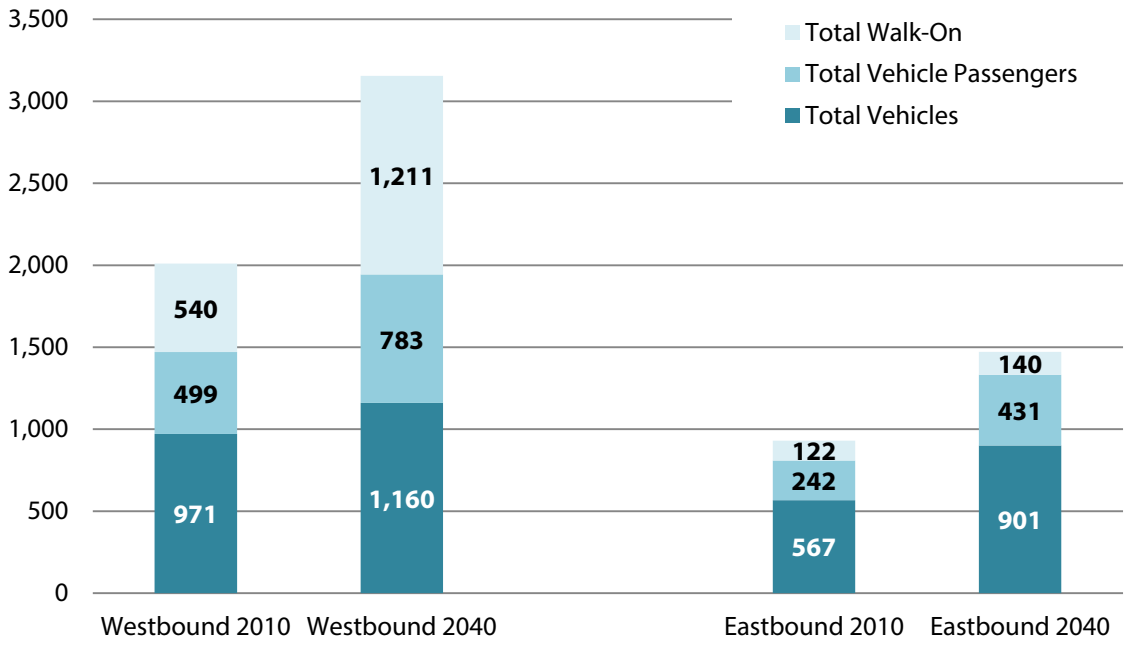
This section summarizes the forecasted vehicular, transit (bus and train), and non-motorized volumes expected by 2040. As regional population and employment grow, the demand for travel will also grow. Comparisons between the 2010 base year and 2040 forecast year are included, illustrating how volumes, trends, and mode choice change or do not change over the next 30 years (see Exhibits 3-7 through 3-12). One set of future travel demand volumes was developed for all 2040 alternatives because none of the alternatives is likely to change the total number of people traveling or how they choose to travel.

The LOS for the Mukilteo-Clinton ferry route, based on the percent of total sailings operating at full capacity, is also analyzed in this section. Data from 2010 and 2040 forecasts were compared to performance thresholds set by the *WSDOT Ferries Division Long-Range Plan*. These performance thresholds are used to identify when additional demand management or additional capacity is required.

Ferry passengers are separated into three categories: vehicle drivers, vehicle passengers, and walk-on passengers. Vehicle drivers represent one driver in each vehicle. Vehicle passengers can be one or more additional passengers per vehicle, such as vanpool users. Walk-on passengers are those passengers who are not associated with a ferry vehicle. Walk-on passengers may park their car near the terminal, ride rail or bus transit, be picked up or dropped off by someone else, or bike or walk to or from the terminal. All of these access modes are grouped into the walk-on passenger category.

Exhibit 3-7 summarizes the 2010 and 2040 volumes for the three types of ferry passengers for the southbound and northbound travel directions. Between 2010 and 2040, PM peak period ridership totals are expected to increase by approximately 60 percent for travel in both directions.

Exhibit 3-7. 2040 Ferry Ridership Volumes by Type (PM Peak Period)



Source: WSF Fare Box Receipts, WSF Model, PM Peak Period (3:00 PM to 7:00 PM)

Northbound travel volumes during the PM peak period are more than double the southbound travel volumes, which reflects typical regional travel patterns where people travel towards Seattle in the morning and away from Seattle in the evening. Travel volumes and mode share are affected or constrained by vehicle capacity limits of the ferry. In the northbound direction, vehicle capacity limits would cause a majority of passenger growth to come from walk-on passengers. In the southbound direction, vehicle capacity is not reached during the PM peak period, resulting in a majority of the passenger growth coming from vehicles.

3.3.3 PM Peak Vehicle Forecasts at the Terminal

Exhibit 3-8 summarizes the 2010 and 2040 vehicle and vehicle passenger volumes for the Mukilteo ferry terminal by direction and the percent increase over the 30-year period. Total volumes for both vehicle and vehicle passengers remain higher in the northbound direction compared to the southbound direction, which is similar to existing conditions.

During the PM peak period, vehicle demand in the northbound direction exceeds capacity; people who want to take their vehicle on the ferry are not likely to make the next sailing during the peak period. By 2040, two new ferries with the capacity for an additional 20 vehicles each are planned to be in operation on the Mukilteo-Clinton ferry route. The 144-vehicle ferries increase the 4-hour PM peak period capacity by

160 vehicles per direction. The added cross-Sound vehicle capacity results in most of the northbound vehicle volume increase from 2010 to 2040.

Exhibit 3-8. PM Peak Period Vehicles and Vehicle Passenger Volumes

Type, Direction	2010 Volumes	2040 Volumes	Percent Increase
Vehicles, Southbound (Unloading)	567	901	59%
Vehicles, Northbound (Loading)	971	1,160	19%
Vehicle Passengers, Southbound (Unloading)	242	431	79%
Vehicle Passengers, Northbound (Loading)	499	783	57%

Source: WSF Fare Box Receipts, WSF Model, PM Peak Period (3:00 PM to 7:00 PM)

3.3.4 PM Peak Walk-On Passenger Forecasts

The number of existing (2010) and future (2040) passengers who walk on and walk off the ferry during the PM peak period are summarized in Exhibits 3-9 and 3-10.

As shown in Exhibit 3-9, northbound walk-on ridership more than doubles from 2010 to 2040, with bus-to-ferry transfer still the most popular mode of access. (Almost 50 percent of people walking onto the ferry in the PM peak period arrive by bus.) The number of people transferring from Mukilteo Station to the ferry increases by more than 400 percent over the same time period. Modest growth is projected for park-and-ride, passenger drop-off, and bicycling.

Exhibit 3-9. Northbound PM Peak Period Walk-On Passenger Volume by Access Mode

Mode of Access	2010 Volumes	2040 Volumes	Volume Increase	Percent Increase
Park-and-Ride	144	206	62	43%
Pick-Up/Drop-Off	28	41	13	46%
Transit – Bus	241	539	298	124%
Transit – Train	70	355	285	407%
Bicycle	3	7	4	133%
Walk	55	63	8	14%
Total	541	1,211	670	124%

Source: November 2010 Field Counts, WSF Forecast Model, PM Peak Period (3:00 PM to 7:00 PM)

As shown in Exhibit 3-10, the total number of walk-off passengers coming from Clinton to Mukilteo in the PM peak period increases by approximately 16 passengers. The most common destination for people walking off the ferry at Mukilteo is to park-and-ride lots. The number of people connecting to bus or the train is low compared to vehicle-based connections.

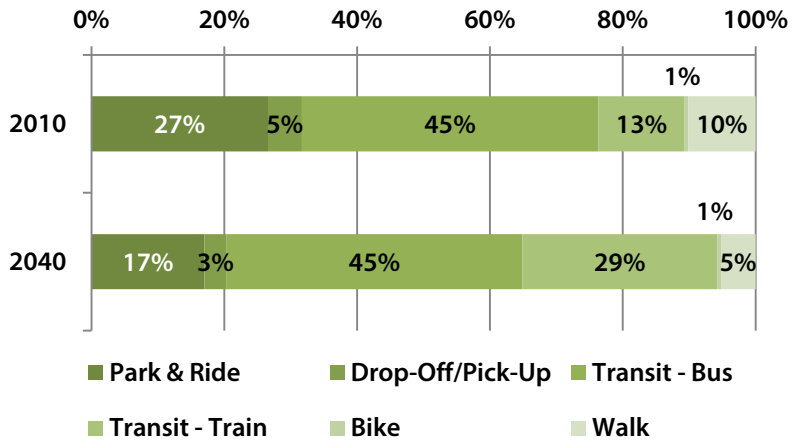
Exhibit 3-10. Southbound PM Peak Period Walk-Off Passenger Volume by Access Mode

Mode of Access	2010 Volumes	2040 Volumes	Volume Increase	Percent Increase
Park and Ride	56	59	3	5%
Pick-Up/Drop-Off	21	24	3	14%
Transit – Bus	13	19	6	46%
Transit – Train	5	9	4	80%
Bicycle	3	3	0	0%
Walk	24	26	2	8%
Total	122	140	18	15%

Source: November 2010 Field Counts, WSF Forecast Model, PM Peak Period (3:00 PM to 7:00 PM)

Exhibit 3-11 summarizes the percent of total people who walk onto the ferry for the northbound PM peak period direction. From 2010 to 2040, the total share of people walking from the transit center (bus) or Mukilteo Station (train) to the ferry increases from 58 percent (45 percent bus and 13 percent train) to 74 percent (45 percent bus and 29 percent train).

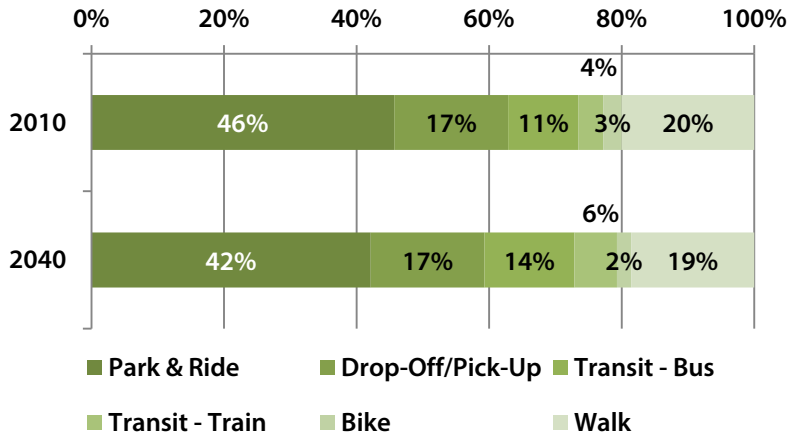
Exhibit 3-11. Northbound PM Peak Period Walk-On Passenger Mode of Access at Mukilteo Ferry Terminal



Source: November 2010 Field Counts, WSF Forecast Model, PM Peak Period (3:00 PM to 7:00 PM)

Exhibit 3-12 summarizes the percent of total people traveling southbound (from Clinton to Mukilteo) who walk off the ferry in the PM peak period. People walking off the ferry in Mukilteo mostly transfer to park-and-ride lots, are picked up, or walk. The lower number of people transferring to bus or rail transit could be a reflection of greater vehicle capacity in the southbound direction during the PM peak period.

Exhibit 3-12. Southbound PM Peak Period Walk-Off Passenger Mode of Egress at Mukilteo Ferry Terminal



Source: November 2010 Field Counts, WSF Forecast Model, PM Peak Period (3:00 PM to 7:00 PM)

3.3.5 Ridership Variation

Ridership variation describes the changes in how many people use the ferry and the mode (bus, train, walk, bike, drive) people choose to make their trip. Ridership variation is important because travel forecasts assume similar ridership trends will continue in the future, except in cases where capacity constraints force behavioral changes, such as peak spreading or mode share shift from drive-on to walk-on.

WSF describes the underlying nature of these trends in its *Long-Range Plan* and previous travel surveys by categorizing trip types into three categories: maintenance, recreational discretionary trips, and non-recreational discretionary trips. Each trip type has a different travel demand implication.

- **Maintenance** trips are those related to day-to-day needs, such as work, school, medical appointments, or personal business.
- **Recreational discretionary** trips are related to sightseeing, special events, or social activities.
- **Non-recreational discretionary** trips consist of shopping trips as well as some social activity trips.

These three trip types, and when they occur, are responsible for much of the variation of travel throughout the week and year.

Maintenance trips are expected to be consistent among weekdays, with lower volumes on the weekend. This trend is observed with transit ridership, which disproportionately captures this trip type.

Recreational discretionary trips are typically observed on weekends during the summer as well as holidays. Throughout the year, this type of trip occurs frequently

on Friday and Saturday in the northbound direction and Sunday in the southbound direction. Good weather and holidays increase demand for this trip type.

Non-recreational discretionary trips occur with more frequency late in the week, with weekdays having the highest occurrence. Average daily ferry volumes grow as the week progresses, likely reflecting this trend.

The factors affecting travel demand associated with each trip type indicate that no significant changes in demand variation should be expected. This is consistent with the travel demand forecast assumptions used in both models and supports the soundness of these assumptions.

3.3.6 Ferry Crossing Levels of Service

Exhibit 3-13 summarizes the percentage of sailings that were full in 2010 and are estimated to be full in 2040. Forecasts were based on 2010 data and projected to 2040. By 2040, the travel forecasts indicate that capacity in all 3 analysis months would exceed the Level 1 Standard, but not the Level 2 Standard. The impacts of this capacity forecast are longer travel time for passengers, longer peak periods, and longer queues on adjoining roadways. The Level 1 and 2 Standards are higher for August due to increased late week, weekend, and summer travel demand that does not necessarily overlap with typical weekday capacity-constrained PM peak periods in January or May.

Exhibit 3-13. Mukilteo-Clinton Ferry Route Level of Service

Month	Level 1 Standard	Level 2 Standard	2010 Data	2040 Forecast
January	25%	65%	8%	32%
May	25%	65%	20%	48%
August	30%	75%	35%	58%

Source: 2010 WSF Fare Box Data and WSF Model Forecast
Note: Values are percent of total northbound sailings that are full

The projected growth in travel led WSDOT to consider how best to address peak period travel demand and related impacts on this route. Because performance in 2040 is not anticipated to exceed the Level 2 Standard, the route does not warrant additional capacity investments above the already planned replacement of the current 124-vehicle ferries with new 144-vehicle ferries. Measures to manage demand to the Level 1 Standard are described in *Section 7.3*.

3.3.7 Terminal Operations

Access Lanes and Vehicle Holding Area

All alternatives, except the Preferred Alternative, include a holding area that can accommodate approximately one-and-a-half of the vehicle holding capacity of the new ferries, which is approximately 216 vehicles. The Preferred Alternative includes a larger holding area, which accommodates up to 266 vehicles. The No-Build and Existing Site Improvements alternatives provide increased flexibility when managing the separation of vehicles in the holding area, because more lanes are provided compared to the Preferred Alternative and Elliot Point 1 Alternative. The vehicle holding area does not directly change the length of the SR 525 shoulder queue. This is because there are typically three toll booths in operation and vehicles generally do not clear the toll booths fast enough to fill the holding area before loading of the next ferry begins. If the transaction time (processing time and time to answer customer questions) at the toll booth was faster or if all four toll booths were operating, the vehicle queue waiting to enter the Mukilteo terminal holding area would be shortened.

All Build alternatives would permit registered HOV users to bypass some or all of the ferry shoulder queuing to access the toll booths. The current design for the Elliot Point 1 Alternative would merge HOV users into the general vehicle queue before they reach the toll booths.

No-Build Alternative

The currently leased holding area would continue to be used for ferry holding. The terminal supervisor's building, passenger building, and toll booths would be replaced at their current locations. The No-Build Alternative provides more holding lanes for managing vehicles; there are approximately 24 lanes. The existing site and its adjacent uses do not allow the terminal facility to include security features for complying with the U.S. Department of Homeland Security regulations and allowing the facility to respond to heightened marine security directives from the U.S. Coast Guard (see *Section 2.1.9*).

Preferred Alternative and Elliot Point 1 Alternative

Because the Preferred and Elliot Point 1 alternatives have approximately seven long holding area lanes and a motorcycle bypass lane, HOV users and trucks may be mixed with other ferry traffic to maximize holding space during peak periods. In compliance with post-9/11 U.S. Department of Homeland Security regulations, security fences and gates would be constructed to allow WSF to secure the holding area during periods of higher security, as required by the U.S. Coast Guard.

Existing Site Improvements Alternative

The Existing Site Improvements Alternative would provide a fourth toll booth and relocate the supervisor's building to provide additional employee parking in the holding area (in addition to the parking provided at the proposed transit center). The space to queue vehicles between the proposed SR 525/First Street intersection and the toll booths would hold two to four vehicles per toll booth lane. If this intersection reduces the number of vehicles able to access the toll booths, the queue of vehicles on SR 525 would increase. As modeled, the three toll booths and surrounding street operations would permit enough vehicles into the holding area to fill the PM peak period vessels.

Overhead Passenger Loading

All Build alternatives include overhead passenger loading, which allows pedestrian and vehicle loading to occur simultaneously by separating vehicles and pedestrians. The No-Build Alternative does not include overhead passenger loading. Overhead passenger loading would be provided by a structure connecting the upper ferry deck to an on-land passenger area and would maintain safe ADA grades during low and high tides, unlike the existing condition. It would also improve pedestrian safety by reducing conflicts with pedestrians and vehicles on the transfer span and where the transfer span meets the nearest roadway. Overhead passenger loading reduces unloading and loading times, which improves ferry schedule reliability.

Ferry Loading and Unloading Times

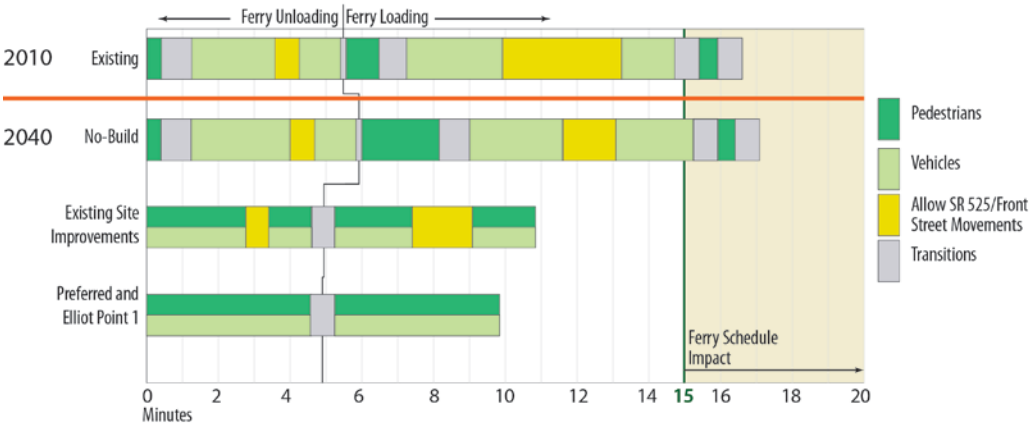
The location of the ferry terminal in relation to the local street system and the presence of overhead passenger loading affect ferry turnaround time. To maintain the 30-minute headways between Mukilteo and Clinton, there is an approximate 15-minute threshold to unload and load passengers at either terminal. When the turnaround time exceeds this threshold, ferry vessels fall behind schedule, causing two operating challenges:

1. **Reduced connection reliability**: Passengers can miss connections to bus and rail services and have increased wait times between connections.
2. **Reduced cross-Sound capacity**: When a ferry falls behind schedule, a sailing could be missed or canceled to return the ferry to the regular scheduled sailing time. Canceling a sailing during the peak period means that approximately 124 (today) and 144 (future) vehicles are delayed until the next sailing, which increases vehicle passenger travel time and the length of queuing vehicles waiting to enter the ferry terminal.

As illustrated in Exhibit 3-14, field observations found existing ferry terminal unloading and loading times can exceed the 15-minute threshold in the PM peak

period. These observations occurred in winter 2010 and the results were used to predict future unloading and unloading times for other alternatives.

Exhibit 3-14. Mukilteo Ferry Terminal Unloading and Loading Times (Observed Winter 2010)



No-Build Alternative

Under the No-Build Alternative, increased ferry ridership means that it takes longer to load and unload passengers. In 2040, it is estimated that the No-Build Alternative terminal configuration would take PM peak period ferries, on average, approximately 17 minutes to unload and load passengers before leaving for Clinton (see Exhibit 3-14). This would affect the overall ferry schedule during the PM peak period. The addition of the northbound right-turn lane to the SR 525/Front Street intersection would reduce the amount of time required to clear the intersection during ferry loading and unloading.

Preferred Alternative

The Preferred Alternative eliminates the time required to stop ferry traffic at the SR 525/Front Street intersection to allow local traffic to clear. This provides a continuous off-loading process that helps meet the objectives of reliability and efficiency. A break in off-loading traffic could be provided off the dock without affecting the ferry off-loading time. The Preferred Alternative would have an on-site ferry exit lane that would be used to store off-loading vehicles and avoid blocking the loading process. Because this alternative does not have to cross a local street from the holding lane to the ferry (such as Front Street in existing conditions), there is no requirement for a break in the loading process. Overhead passenger loading would allow vehicles and walk-on passengers to load simultaneously, which also reduces turnaround time. The average load and unload time would be approximately 10 minutes, which is below the 15-minute threshold and would enable the ferries to maintain their schedules.

Elliot Point 1 Alternative

Similar to the Preferred Alternative, this alternative eliminates the time required to stop ferry traffic at the SR 525/Front Street intersection. This alternative would begin stopping off-loading vehicles at the west driveway/transit center once enough vehicles have passed so the vehicle queue does not extend back to block the loading process.

Existing Site Improvements Alternative

As illustrated in Exhibit 3-14, the addition of overhead passenger loading for the Existing Site Improvements Alternative would reduce the time to load and unload each ferry to 11 minutes, almost 6 minutes faster than the No-Build Alternative, and would enable the ferries to maintain their schedules.

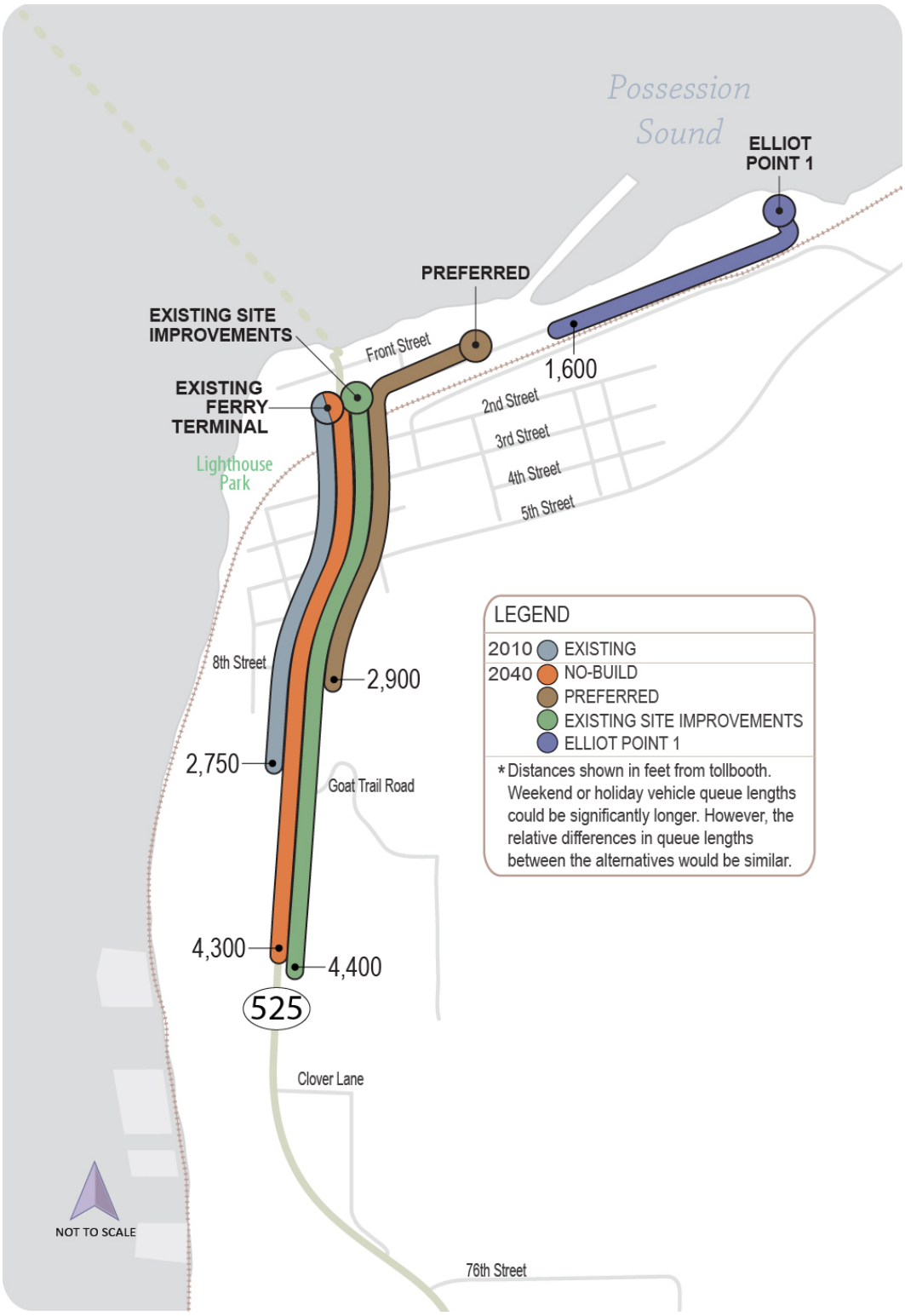
Ferry Shoulder Queuing

Ferry shoulder queuing was evaluated at the Mukilteo ferry terminal using the micro-simulation tool VISSIM Version 5.2. The ferry shoulder queues that typically occur during the weekday PM peak period are projected to increase for the 2040 No-Build, Preferred, and Existing Site Improvements alternatives, compared to 2010 conditions. Elliot Point 1 is the only alternative where vehicle queues from the toll booth would not extend to SR 525 during the PM peak period on a daily basis. Under all alternatives, higher weekend and seasonal travel would continue to create longer queues. The analysis assumed that three toll booths were operating and the fourth was held in reserve, which is typical for daily operations.

The queue lengths illustrated in Exhibit 3-15 are measured from the toll booths to the end of the queue and includes intersection and driveway areas where vehicles are restricted from blocking access. The differences in queue lengths shown in Exhibit 3-15 are based on the following factors:

- The amount of vehicle queue space behind each toll booth in the holding area (not on First Street or SR 525) to avoid larger vehicles blocking access to the toll booths—The No-Build and Existing Site Improvements alternatives both have limited vehicle maneuvering space behind the toll booths off SR 525.
- The areas where vehicles are not able to queue for driveways and intersections—Alternatives with longer queues on SR 525 (No-Build and Existing Site Improvements) are affected the most, followed by the Preferred Alternative because vehicles must keep clear of driveways and intersections.
- The efficiency of traffic signal operations at the SR 525/Fifth Street and SR 525/First Street intersections—Alternatives with longer queues on SR 525 (No-Build and Existing Site Improvements) are affected the most, followed by the Preferred Alternative. For Elliot Point 1, ferry and non-ferry traffic are able to travel through the SR 525/Fifth Street intersection on the same signal phase, which improves efficiency and minimizes the overall queue length.

Exhibit 3-15. Typical Weekday Peak Period Ferry Shoulder Queue Length in Mukilteo



3.3.8 Navigable Waterways

The effects on navigation for ferries crossing the shipping lane would be similar to existing conditions and would not vary significantly among alternatives. Other effects on navigable waterways would also be similar to existing conditions.

3.3.9 Mukilteo Terminal Facility Safety and Security

No-Build Alternative

The existing vehicle holding area would remain at the same location where it currently exists. Because the No-Build Alternative preserves the existing facility, the safety issues discussed in *Section 2.1.9* are unchanged. Moving the transfer span signal to the SR 525/Front Street intersection provides increased visibility between vehicles and pedestrians, which reduces the chance for collisions.

Preferred Alternative

Overhead passenger loading (see *Section 3.3.7*), which separates vehicles and pedestrians during ferry loading and unloading, reduces the risk of collisions. Passengers could travel between the ferry and the transit center without crossing a roadway, which eliminates any conflict with vehicle traffic. People traveling between the ferry terminal and Mukilteo Station would likely cross at the unsignalized west driveway of the proposed transit center. This crossing location would avoid pedestrians having to cross traffic when arriving at or leaving the ferry terminal (see Exhibit 3-2). This alternative would include security fences and gates to allow the holding area to be secured during periods of higher security.

Existing Site Improvements Alternative

Overhead passenger loading (see *Section 3.3.7*), which separates vehicles and pedestrians during ferry loading and unloading, reduces the risk of collisions. Also, the passenger building would be relocated to the northeast corner of the SR 525/Front Street intersection, which would allow passengers to walk to the transit center and Mukilteo Station without crossing ferry loading and unloading traffic. The proposed transit center would provide space for six separate bus bays and would eliminate buses blocking roadways such as Front Street. Properly sized bus zones would ensure that bus passengers wait for, load, and unload in designated areas.

Elliot Point 1 Alternative

This alternative would have the same safety characteristics as the Preferred Alternative, except people traveling between the transit center and Mukilteo Station would cross at the signalized east driveway/First Street intersection (see Exhibit 3-4).

3.4 ROADWAY NETWORK

3.4.1 Roadway Modifications

This section describes the roadway modification occurring as part of the No-Build and Build alternatives (see Exhibits 3-1 through 3-4 for illustrations of each alternative). All Build alternatives would incorporate the improvements included in the No-Build Alternative. No changes are proposed for the other intersections along SR 525 or the Glenwood Avenue/Mukilteo Boulevard intersection.

Conditions Common to All Alternatives

Roadway improvements occurring prior to 2040 that are common to all alternatives include a northbound right-turn lane at the stop-controlled SR 525/Front Street intersection. This northbound right-turn lane would reduce the vehicle delay at this intersection by permitting both right-turning and left-turning vehicles to turn at the same time. Also, vehicles would be permitted to turn right during ferry unloading. During ferry unloading and peak periods, vehicles queuing to turn left towards Mukilteo Lighthouse Park and businesses could temporarily block the northbound right-turn lane. This is the primary intersection that would be affected differently among the alternatives.

No-Build Alternative

The existing signal on the Mukilteo ferry terminal transfer span would be relocated south towards the SR 525/Front Street intersection. Moving this signal would not affect the SR 525/Front Street intersection operation because it would continue to operate as a three-way stop-controlled intersection when ferry traffic was not loading or unloading. The purpose of moving the transfer span signal is to increase safety by stopping vehicles at the intersection, which gives drivers and pedestrians increased visibility and awareness of each other's movements.

Preferred Alternative

First Street would be realigned and reconstructed as a four-lane roadway from SR 525 to the western edge of the proposed Mukilteo ferry terminal, across from the existing Mount Baker railroad crossing. First Street would provide ferry queuing in the eastbound (south side) curb lane. Bicycle lanes would be provided in both directions between SR 525 and the ferry holding entrance. In addition, a westbound bicycle lane would be provided along the ferry exit lane and an eastbound bicycle lane would be extended from the ferry holding area to the west driveway of the transit center. Sidewalks would be provided along First Street. Access to the Mount

Baker Terminal would require construction of a new roadway access from First Street east of the Mount Baker crossing.

New signals would be provided on First Street at its intersection with SR 525 and the ferry holding area entrance. All signals along First Street would incorporate transit signal priority, which allows buses to receive a green light upon arrival at an intersection. The Park Avenue/First Street intersection would be southbound stop-controlled. The south block face of Front Street between SR 525 and Park Avenue would be redeveloped as part of a future undefined project.

Existing Site Improvements Alternative

To reduce the impact of ferry loading and unloading operations on local traffic, First Street would be extended westward to a new signalized intersection with SR 525. This intersection would operate similar to the SR 525/Fifth Street intersection, where shoulder ferry queuing would enter the holding area controlled by a separate signal phase. The extension of First Street would provide an outlet for vehicles circulating from the waterfront area on a one-way eastbound Front Street and a one-way southbound Park Avenue. First Street would provide a direct route for vehicles, bicycles, and pedestrians to the Mukilteo Station. The Mount Baker Terminal would be accessed via Front Street and through the NOAA Mukilteo Research Station property similar to existing conditions.

Elliot Point 1 Alternative

The Elliot Point 1 Alternative holding area is located at the eastern edge of the Mukilteo Tank Farm. Access to the holding area would be provided by the realignment and extension of First Street from SR 525 to the western edge of the Mukilteo ferry terminal site. First Street would be a four-lane roadway with sidewalks, bicycle lanes, and ferry queuing on the eastbound (south side) curb lane. New signals would be provided on First Street at its intersection with SR 525, the western transit center driveway, and the eastern transit center driveway/Mount Baker railroad crossing. All signals along First Street would incorporate transit signal priority, which allows buses to receive a green light upon arrival at an intersection. The Mount Baker railroad crossing would be open to pedestrians and emergency vehicles only. The Mount Baker Terminal would be accessed via First Street and through the NOAA Mukilteo Research Station, similar to existing conditions.

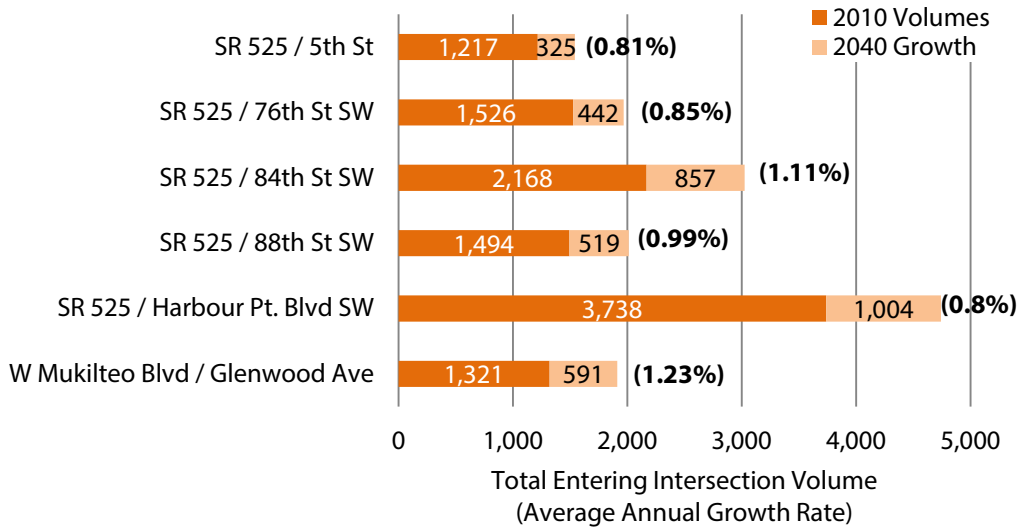
The Park Avenue/First Street intersection would be reconstructed with stop-control for the southbound and northbound (exit from Mukilteo Station parking lot) movements. First Street would be realigned to provide access to a reconfigured parking area for the commuter rail station.

3.4.2 Traffic Volumes

Ferry ridership demand was constant for all 2040 alternatives because the change in the multimodal connections for each alternative is not anticipated to affect how people choose to travel. Therefore, traffic volumes south of the SR 525 bridge over the BNSF tracks do not vary by alternative.

Exhibit 3-16 summarizes the change in total PM peak hour entering volumes for study area intersections from 2010 to 2040, as well as the average annual growth rate over the 30-year forecast horizon. The SR 525/Fifth Street intersection serves the lowest amount of traffic among the study intersections and is forecasted to have the least amount of growth, with 325 additional vehicles by 2040. The SR 525/Harbour Pointe Boulevard SW intersection serves the highest number of vehicles among the study intersections, serving an additional 1,004 vehicles by 2040.

Exhibit 3-16. PM Peak Hour Total Entering Intersection Volumes for 2010 and 2040 Growth

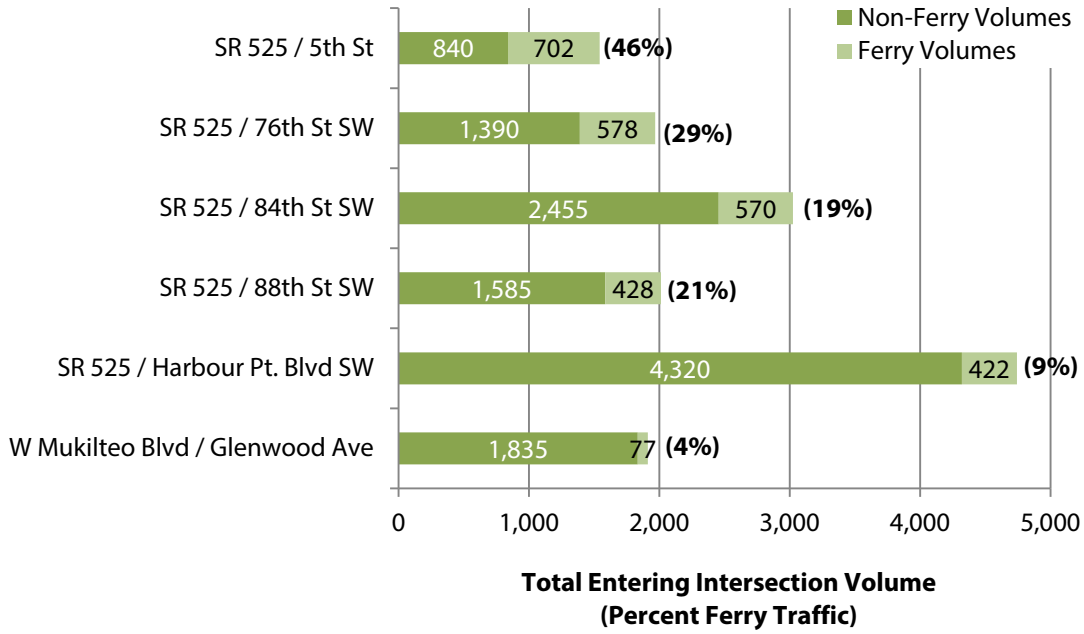


Source: 2010 WSDOT Intersection Counts and PSRC Model
Note: PM peak hour volumes are maximum PM peak volumes over a 1-hour span.

Because the 2010 to 2040 increase in vehicles accessing the Mukilteo ferry terminal in the PM peak period (see Exhibit 3-8) is relatively low, the majority of the increase in future volumes (see Exhibit 3-16) is from background traffic growth. This is important because most of the increase in intersection delay summarized in Exhibit 3-30 (below) is from background traffic growth.

Exhibit 3-17 summarizes the 2040 PM peak hour ferry and non-ferry total entering intersection vehicle volumes and the percent of total entering vehicles that ferry traffic represents. As shown in Exhibit 3-17, the percent of traffic at the intersection that is ferry-related traffic increases towards the Mukilteo ferry terminal.

Exhibit 3-17. Total Entering Vehicle Volume by Ferry and Non-Ferry-Related Traffic (2040 PM Peak Hour)



Source: 2010 WSDOT Intersection Counts and PSRC Model
Note: PM peak hour volumes are maximum volumes over a 1-hour span.

3.4.3 PM Peak Hour Ferry Vehicle Volumes and Circulation

The way in which vehicles circulate on roadways north of Second Street in the vicinity of the Mukilteo ferry terminal varies by alternative. Exhibits 3-18, 3-19, and 3-20 illustrate the circulation of ferry-related vehicles in the terminal area and include drive-on vehicles, park-and-ride vehicles, pick-up/drop-off vehicles, and buses. In all alternatives, the majority of ferry-related vehicles arriving or departing the terminal area are either loading or unloading from the ferry.

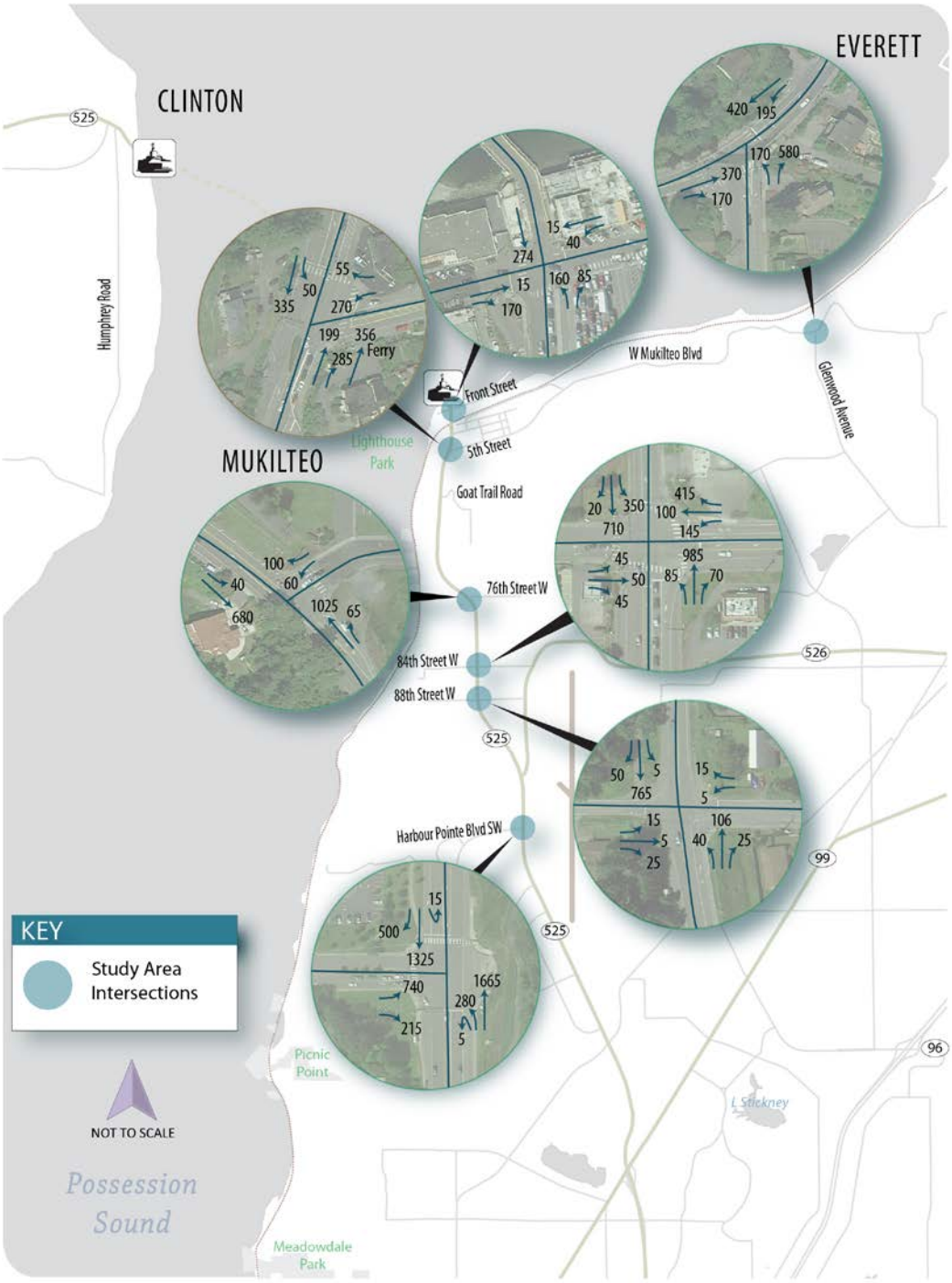
No-Build Alternative

Vehicle circulation patterns for this alternative are the same as existing conditions, but with 2040 traffic volumes. Northbound vehicles boarding the ferry enter the holding area after crossing the SR 525 bridge over the BNSF tracks (see Exhibit 3-18). Southbound vehicles unloading from the ferry travel southbound on SR 525 (see Exhibit 3-19). Park-and-ride users are expected to continue to disperse around the terminal area depending on the availability of parking. Transit vehicles continue to use the two bus bays located in the southwest corner of SR 525 and Front Street and pick-ups and drop-offs occur near the terminal. Exhibit 3-20 illustrates projected 2040 PM peak hour turning movement volumes for SR 525 and Mukilteo Boulevard.

Exhibit 3-18. 2040 PM Peak Hour Inbound Vehicle Volume Flows – No-Build Alternative

Exhibit 3-19. 2040 PM Peak Hour Outbound Vehicle Volume Flows – No-Build Alternative

Exhibit 3-20. 2040 No-Build Alternative PM Peak Hour Volumes



Preferred Alternative

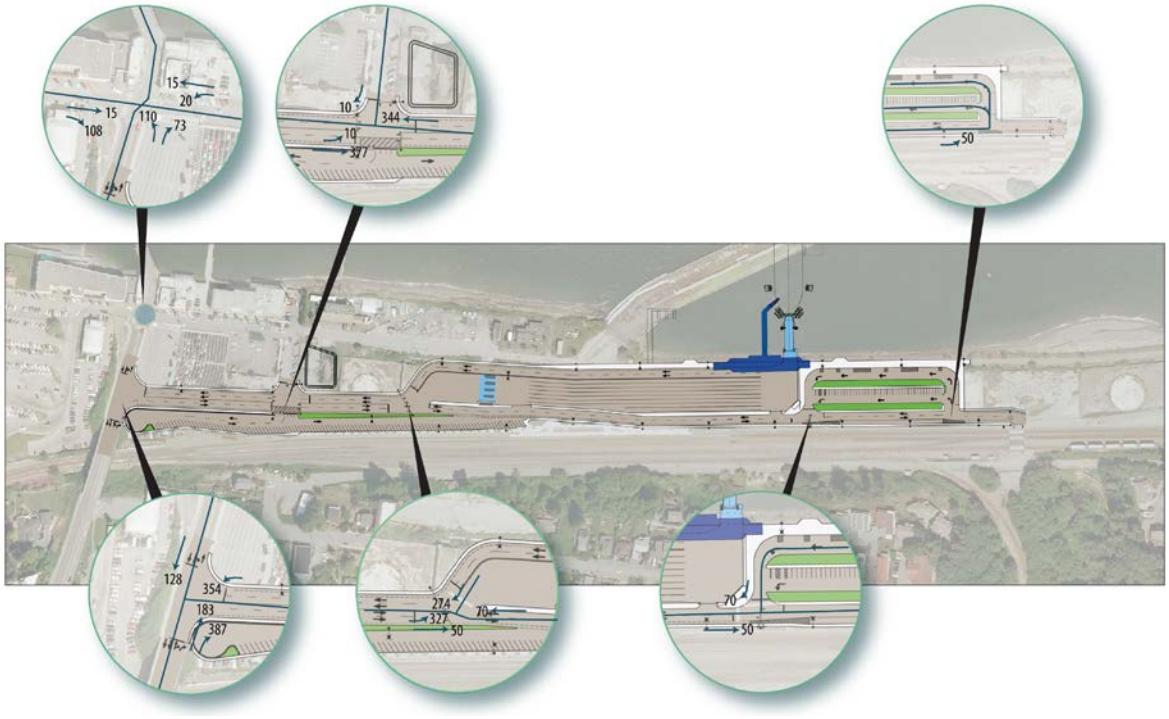
Exhibits 3-21 and 3-22 illustrate inbound and outbound PM peak hour flows for ferry-related vehicles. This alternative shifts a majority of inbound and outbound vehicle traffic onto First Street, with high turning movements at the intersection of SR 525 and First Street. Inbound traffic traveling to the ferry would enter the Mukilteo ferry terminal from First Street east of Park Avenue. Other vehicles such as buses and pick-up/drop-off vehicles would continue down the length of First Street to their designated areas on the east side of the terminal. Buses and pick-up/drop-off vehicles leaving the terminal would merge with off-loading traffic at the signalized intersection of First Street and the terminal holding area. Park-and-ride vehicles are expected to continue to use available surface parking lots.

Exhibit 3-21. 2040 PM Peak Hour Inbound Vehicle Volume Flows – Preferred Alternative

Exhibit 3-22. 2040 PM Peak Hour Outbound Vehicle Volume Flows – Preferred Alternative

Projected 2040 PM peak hour turning movement volumes on SR 525 and Mukilteo Boulevard for the Preferred Alternative are the same as for the No-Build Alternative, except for the roadways surrounding the Mukilteo ferry terminal. Exhibit 3-23 illustrates the turning movement volumes for the proposed roadway modifications and changes in local roadway operations.

Exhibit 3-23. 2040 PM Peak Hour Volumes for the Preferred Alternative – Ferry Terminal Vicinity



Existing Site Improvements Alternative

Exhibits 3-24 and 3-25 illustrate the inbound and outbound forecasted vehicle volumes for ferry-related vehicles in the terminal area during the PM peak hour. Vehicle circulation for this alternative changes compared to the No-Build Alternative. One way, eastbound-only travel on Front Street and southbound-only travel on Park Avenue are identified in the alternative. This alternative also includes a new two-way First Street extension that connects SR 525 to the existing Mukilteo Station parking lot and Park Avenue.

This alternative redirects buses to First Street to access the bus bays, and then loops them around the designated bus bays back to First Street to exit. This change would improve bus operations during ferry loading and unloading because buses would be able to access the transit center, which provides an adequate number of bus stops.

Loss of some overnight parking capacity due to relocation of the bus bays would reduce inbound vehicle volumes. The new bus bays would be located on a site that currently provides paid overnight parking. With construction of the bus bays, the existing park-and-ride users are expected to move elsewhere.

Exhibit 3-24. 2040 PM Peak Hour Inbound Vehicle Volume Flows – Existing Site Improvements Alternative

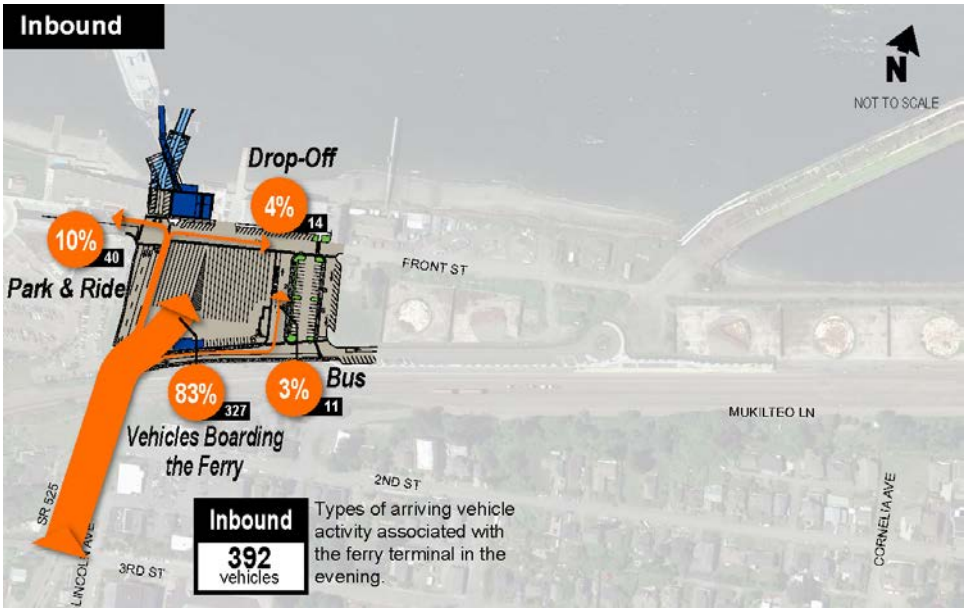
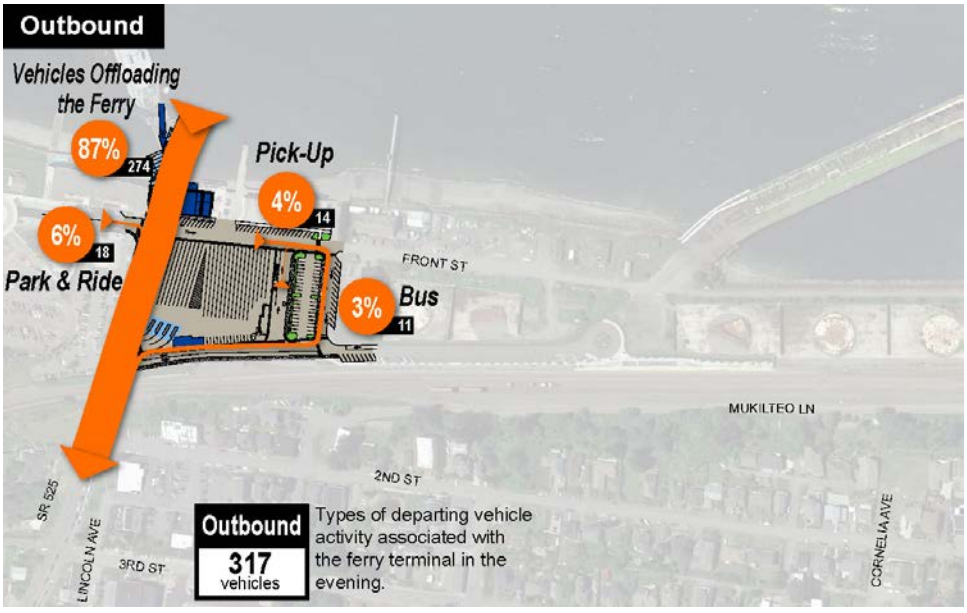
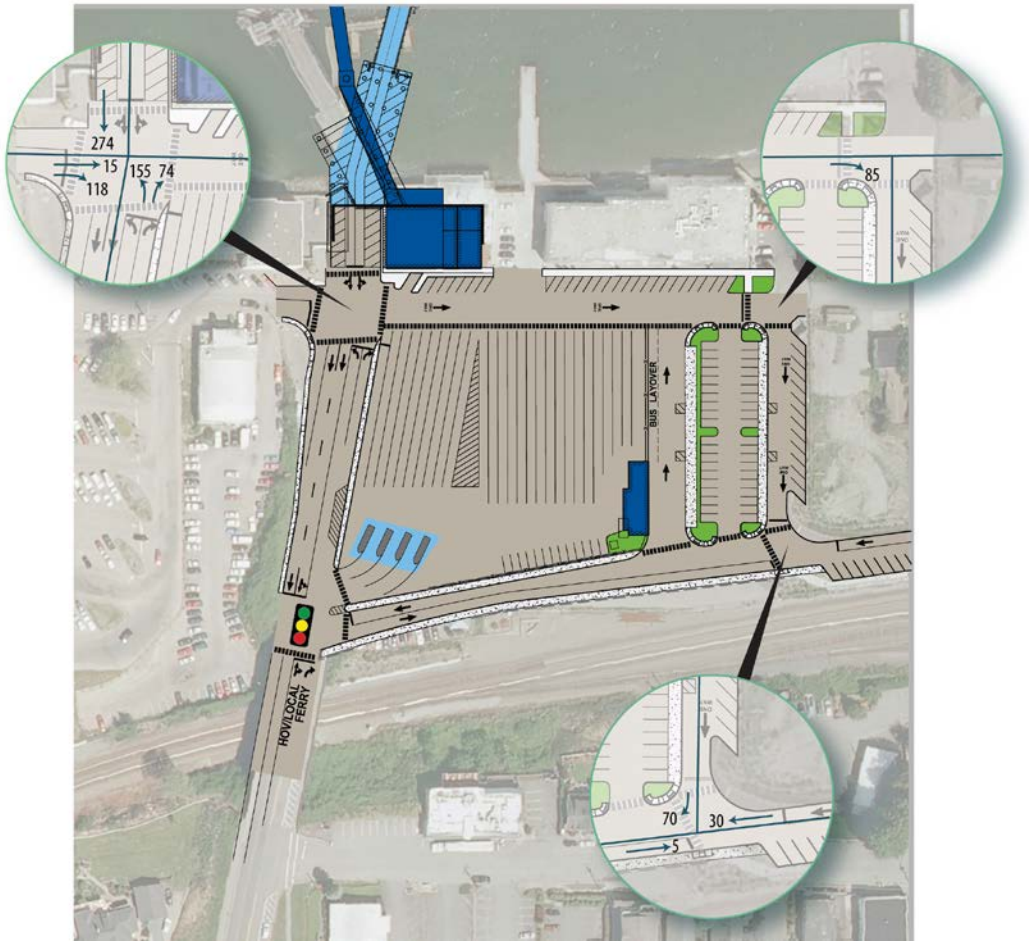


Exhibit 3-25. 2040 PM Peak Hour Outbound Vehicle Volume Flows – Existing Site Improvements Alternative



Projected 2040 PM peak hour turning movement volumes on SR 525 and Mukilteo Boulevard are the same for the Existing Site Improvements Alternative compared to the No-Build Alternative, except for the roadways surrounding the Mukilteo ferry terminal (see Exhibit 3-26 for Mukilteo ferry terminal area volumes).

Exhibit 3-26. 2040 PM Peak Hour Volumes for Existing Site Improvements Alternative – Ferry Terminal Vicinity

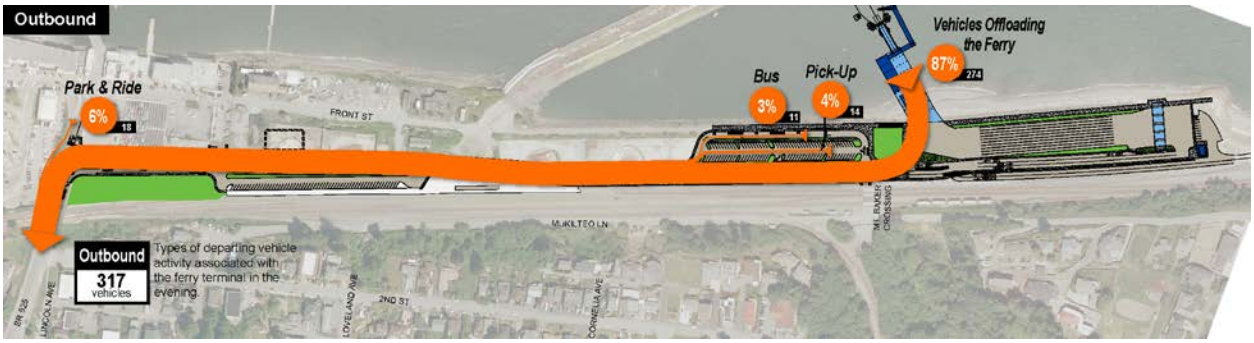


Elliot Point 1 Alternative

Exhibits 3-27 and 3-28 illustrate forecasted inbound and outbound ferry vehicle volume flows during the PM peak hour. This alternative shifts a majority of inbound and outbound vehicle traffic onto First Street, with high turning volume at the intersection of SR 525 and First Street. Inbound traffic traveling to the ferry would traverse the length of First Street, entering the toll booth at the east end of the site. Outbound traffic would travel through the new intersection of First Street and the Mount Baker rail crossing, then along First Street before turning left onto SR 525.

Exhibit 3-27. 2040 PM Peak Hour Inbound Vehicle Volume Flows – Elliot Point 1 Alternative

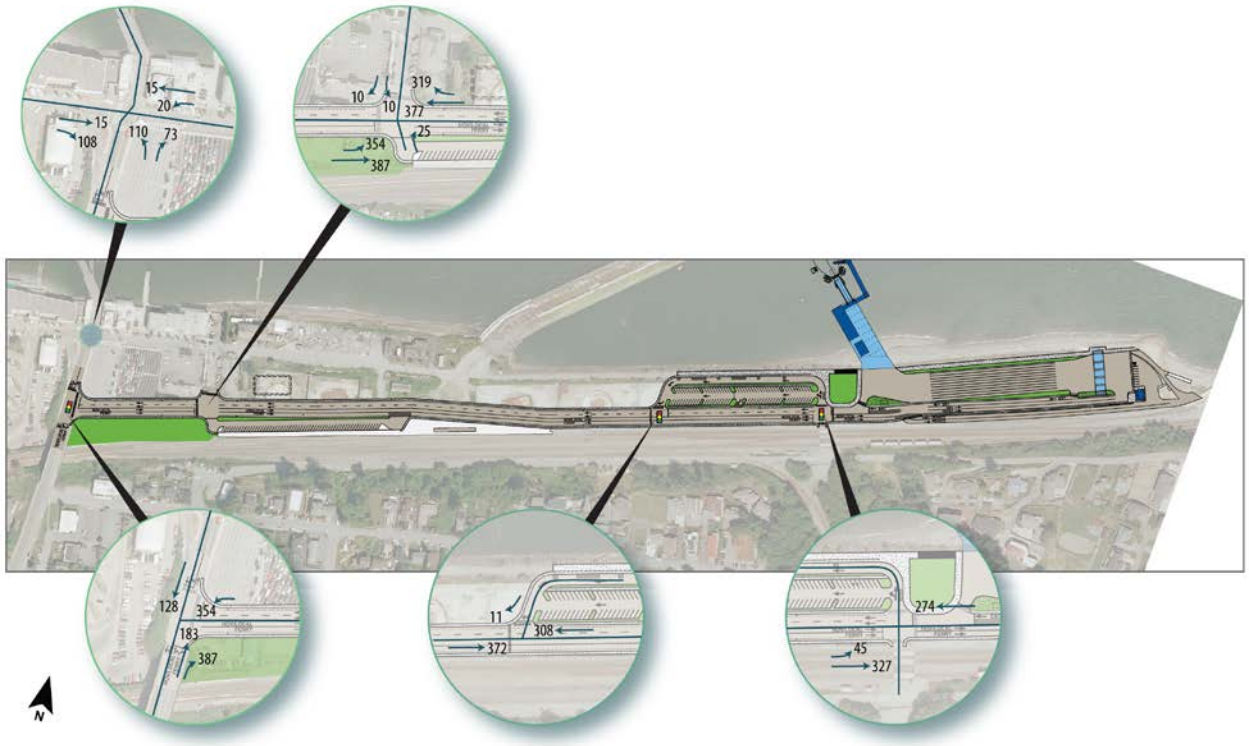
Exhibit 3-28. 2040 PM Peak Hour Outbound Vehicle Volume Flows – Elliot Point 1 Alternative



Buses and pick-up/drop-off vehicles also would use First Street but enter the bus bay and parking area to the west of the new terminal. Bus and pick-up/drop-off vehicles must yield to unloading ferry traffic when exiting the parking lot and bus bay. Park-and-ride vehicles are expected to continue to use SR 525 and Front Street to access parking spots.

Projected 2040 PM peak hour turning movement volumes on SR 525 and Mukilteo Boulevard for the Elliot Point 1 Alternative are the same as for the No-Build Alternative, except for the roadways surrounding the Mukilteo ferry terminal. Exhibit 3-29 illustrates the turning movement volumes for the proposed roadway modifications and changes in local roadway operations.

Exhibit 3-29. 2040 PM Peak Hour Volumes for Elliot Point 1 Alternative – Ferry Terminal Vicinity



3.4.4 Traffic Operations

An LOS analysis was conducted for the study intersections using the software program Synchro 7 (Build 773) for intersections outside of the existing and proposed ferry terminal area.

Conditions Common to All Alternatives

Intersection operations along SR 525 between Fifth Street and Harbour Pointe Boulevard and the Mukilteo Boulevard/Glenwood Avenue intersection are projected to be similar. This is because projected 2040 roadway volumes are the same for the No-Build Alternative and the Build alternatives. The LOS for the study area intersections south and east of Fifth Street are summarized in Exhibit 3-30. Also, the No-Build Alternative and Build alternatives would maintain a similar break in off-loading traffic to allow side street traffic to turn onto SR 525.

Exhibit 3-30. 2040 Level of Service Summary (PM Peak Hour)

Intersection	Control Type	LOS	2010 Existing Delay (sec/veh)	LOS	2040 No-Build and Build Alternatives Delay (sec/veh)
SR 525/Harbour Pointe Boulevard	Signal	C	21	D	51
SR 525/88th Street SW	Stop Sign	E	43	F	> 200
SR 525/84th Street SW/SR 526	Signal	C	28	D	52
SR 525/76th Street SW	Stop Sign	C	20	D	29
SR 525/Fifth Street	Signal	D	51	E	55
West Mukilteo Boulevard and Glenwood Avenue	Signal	B	14	C	24

As shown in Exhibit 3-30, vehicle delay at intersections increases from 2010 to 2040, which is caused more by increases in background traffic volumes than by the small increase in ferry vehicle traffic. In 2040, the SR 525/88th Street and SR 525/Fifth Street intersections have a projected failing LOS because they would exceed the standard set by the City of Mukilteo of LOS D or better. Traffic turning from 88th Street or crossing SR 525 would experience a long delay because of insufficient gaps in traffic along SR 525.

Intersection delay for buses would be the same as vehicle traffic (shown in Exhibit 3-30), except for intersections along First Street for the Build alternatives, which would incorporate transit signal priority.

No-Build Alternative

Roadway improvements occurring prior to 2040 include the relocation of the existing signal on the Mukilteo ferry terminal transfer span south towards the SR 525/Front Street intersection.

The No-Build Alternative LOS for the SR 525/Front Street intersection is summarized in Exhibit 3-31 and is projected to remain at LOS E. The vehicle delay would increase slightly during the PM peak hour, which includes the time vehicles at the intersection are stopped during the ferry unloading and loading process. Vehicle delay at the Park Avenue/Front Street and Park Avenue/First Street intersections would increase slightly due to increased pedestrian traffic between the Mukilteo ferry terminal and Mukilteo Station.

Exhibit 3-31. No-Build Alternative Level of Service Summary (PM Peak Hour)

		Existing 2010		No-Build 2040	
Intersection	Control Type	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
SR 525/Front Street	Stop Sign	E	48	E	52

Preferred Alternative

People driving to the Mukilteo ferry terminal would turn at a new SR 525/First Street intersection and travel east to the toll booth entrance/First Street intersection. Vehicles would queue along the curb lane of SR 525, as they do today, and along First Street. Authorized HOV users would drive in the inside lane, bypassing the shoulder queuing, and enter into mixed traffic immediately before the toll booths.

The LOS for intersections in the immediate vicinity of this alterative is summarized in Exhibit 3-32. The LOS at the SR 525/Front Street intersection would decrease by almost 38.0 seconds compared to the No-Build Alternative. This is because the ferry terminal would be relocated and the holding and unloading operations would no longer affect this intersection directly. The modified intersections resulting from the First Street extension would operate at an acceptable LOS.

Exhibit 3-32. Preferred Alternative Level of Service Summary (2040 PM Peak Hour)

		No-Build Alternative		Preferred Alternative	
Intersection	Control Type	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
SR 525/Front Street	Stop Sign	E	52	B	14
SR 525/First Street	Signal	n/a	n/a	A	7
Park Avenue/First Street	Stop Sign	n/a	n/a	A	10
Toll booth/First Street	Signal	n/a	n/a	B	11

Existing Site Improvements Alternative

Vehicle drivers to the Mukilteo ferry terminal would enter the holding area after passing through a new signal at the SR 525/ First Street intersection. Vehicles would queue along the curb lane of SR 525, as they do today, and along First Street. Authorized HOV users, such as vanpools, would bypass the shoulder queuing lane using the inside lane, and enter into mixed traffic immediately before the toll booths. This alternative provides enough space to queue two to three vehicles between the toll booths and the SR 525/Front Street intersection. To ensure that vehicles are always present at the toll booth, this intersection should permit ferry traffic to move approximately every 50 seconds. Because regular ferry traffic and authorized HOV users move separately at the intersection, there is a potential for short-term blockage of eastbound First Street traffic until vehicles proceed through the toll booths. If the intersection interferes with the number of vehicles able to pass through the toll booths, the number of vehicles in the SR 525 shoulder queue would increase.

The LOS for intersections in the immediate vicinity of this alternative is summarized in Exhibit 3-33. Overhead passenger loading would slightly reduce the duration of intersection blockage during ferry loading and unloading compared to the No-Build Alternative because pedestrian trips from the terminal to the bus stop would no

longer cross this intersection. The modified intersections resulting from the First Street extension would operate at an acceptable LOS.

Exhibit 3-33. Existing Site Improvements Alternative Level of Service Summary (2040 PM Peak Hour)

		No-Build Alternative		Existing Site Improvements Alternative	
Intersection	Control Type	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
SR 525/Front Street	Stop Sign	E	52	E	48
SR 525/First Street	Signal	n/a	n/a	B	17
Park Avenue/First Street	Stop Sign	n/a	n/a	A	10

Elliot Point 1 Alternative

The route for drivers to the ferry terminal for the Elliot Point 1 Alternative would be very similar to the Preferred Alternative from SR 525 to the Mukilteo Tank Farm.

The LOS for intersections in the immediate vicinity of this alternative is summarized in Exhibit 3-34. The delay at the SR 525/Front Street intersection would decrease by almost 38 seconds compared to the No-Build Alternative. This is because the ferry terminal would be relocated and the loading and unloading operations would no longer affect this intersection directly. The modified intersections resulting from the First Street extension would operate at an acceptable LOS.

Exhibit 3-34. Elliot Point 1 Alternative Level of Service Summary (2040 PM Peak Hour)

		No-Build Alternative		Elliot Point 1 Alternative	
Intersection	Control Type	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
SR 525/Front Street	Stop Sign	E	52	B	14
SR 525/First Street	Signal	n/a	n/a	A	6
Park Avenue/ First Street	Stop Sign	n/a	n/a	A	10
West driveway/ First Street	Stop Sign	n/a	n/a	A	9
East driveway/ First Street	Signal	n/a	n/a	A	1

3.4.5 Roadway Network Safety

The types of collisions and proportions of collision severity described in *Section 2.2.4* along SR 525 would not be affected by the Build alternatives because modifications to SR 525 south of Third Street are not proposed. Aspects of the physical roadway environment that would be refined during the design process include appropriate

turning radii at intersections, safe lane widths, adequate lighting, safe sight distances, and other approved geometric standards to improve safety.

3.5 NON-MOTORIZED TRANSPORTATION

This section summarizes the changes to the non-motorized environment identified in each alternative and how it affects pedestrians and bicyclists. The non-motorized environment, which includes sidewalks, crosswalks, overhead passenger loading, bicycle lanes, and other pedestrian and bicycle-related facilities around the terminal, vary with each alternative.

Each Build alternative changes travel flows and travel distances for non-motorized users connecting to and from the Mukilteo ferry terminal compared to the No-Build Alternative. Forecasted distributions for pedestrians and bicyclists are presented for each alternative.

3.5.1 Pedestrian Conditions and Facilities

Pedestrian conditions refer to the pedestrian environment of the project area, including conflicts with motorized modes (especially during ferry loading and unloading), presence of sidewalks and crosswalks, integration with other pedestrian facilities and destinations, and the general pedestrian experience.

None of the alternatives includes modifications to the SR 525 bridge over the BNSF tracks, such as wider sidewalks or bicycle lanes. WSDOT has determined this bridge to be structurally sound, and has no immediate plans to replace the structure as part of the State Highway System Plan. This bridge has 3-foot-wide sidewalks on both sides. Other potential projects that could affect the SR 525 corridor that are not associated with this project are discussed further in *Chapter 6 Cumulative Impacts*.

No-Build Alternative Pedestrian Conditions and Facilities

This alternative maintains the same footprint as the current terminal. Specific components of the ferry terminal are replaced to maintain operations, but no other changes are made. As part of this alternative, the existing terminal passenger building, which is located on the northwest corner of the SR 525/Front Street intersection, would be replaced. Also, the transfer span signal is being relocated closer to the intersection. Both of these modifications would improve accessibility to the passenger building and pedestrian-vehicle visibility at the intersection. No other improvements in the terminal area are identified.

Preferred Alternative

This alternative includes sidewalks along the First Street extension from SR 525 to the east end of the proposed Mukilteo ferry terminal. Starting where the Mukilteo ferry terminal approaches the shoreline, a waterfront promenade would be constructed that would extend to the eastern end of the transit center. This promenade would be divided by the vehicle transfer span, but pedestrians on either side of the promenade would be able to cross on an elevated structure. Access to the passenger building and overhead passenger loading would be provided from the promenade on both sides of the transfer span.

Pedestrians transferring to or from buses would have a short walk to the passenger building and would not have to cross a road. Pedestrians transferring to Mukilteo Station would have one unsignalized crossing of First Street, which has low vehicle volumes at this location. This is because vehicles enter and exit the Mukilteo ferry terminal to the east of Park Avenue.

New overhead lighting would be provided along First Street and for the terminal facilities, including the vehicle holding area, the commuter rail parking area, and the new bus bays.

Existing Site Improvements Alternative

This alternative includes overhead passenger loading from a new passenger building to the ferry, which would change pedestrian flows immediately next to the terminal (also *see Section 3.5.4*). The addition of overhead passenger loading necessitates the relocation of the terminal entrance from the northwest corner of the SR 525/Front Street intersection to the northeast corner. This improvement would not eliminate pedestrian crossings at the SR 525/Front Street intersection, especially during unloading or loading of ferry vehicles. However, because the bus stop and passenger buildings would be relocated, the number of pedestrians crossing this location would be significantly lower. Pedestrians connecting between the transit center, passenger building, and Mukilteo Station would no longer have to cross SR 525.

The proposed signalized SR 525/First Street intersection would allow for a signal-controlled pedestrian crossing of SR 525, which does not currently exist north of Fifth Street. The extension of First Street between Park Avenue and SR 525 would include sidewalks on both sides of the road.

Elliot Point 1 Alternative

This alternative includes sidewalks on both sides of the First Street extension from the intersection of SR 525 to the toll booths at the eastern end of the site. The sidewalk would extend through Mukilteo Station on the south side of First Street. Overhead passenger loading is included at the Mukilteo ferry terminal, with a

connection to the sidewalk network on the west side of the vehicular transfer span. A sidewalk would be provided on the north side of the private access road to the Mount Baker Terminal, which is located to the east of the ferry vehicle holding area.

Along the Mukilteo ferry terminal's waterfront, a promenade would be constructed. The eastern and western portions of the promenade would be separated by the terminal building and pedestrians on either side of the promenade would be unable to cross to the other side. The western part of the promenade would be accessed through the Port of Everett employee parking area. Pedestrians walking between the eastern and western promenade would leave the shoreline promenade and use sidewalks provided through the transit center, along First Street (south of the Mukilteo ferry terminal holding area) and the Mount Baker Terminal parking area.

The Mount Baker railroad crossing would be open to pedestrians only as part of this alternative, but it is currently closed because there are no connecting pedestrian or roadway facilities north of the railroad tracks. This intersection would provide an at-grade crossing of the BNSF tracks, which could increase the number of people crossing at this location. However, because there are limited pedestrian facilities on Mukilteo Lane, pedestrians were assumed to use First Street. The Mount Baker crossing would provide pedestrian access to the public beach adjacent to the Mount Baker Terminal

The new signalized Mount Baker crossing/First Street intersection is a pedestrian-vehicle conflict point—a location where vehicle and pedestrian flows cross and create the potential for collisions. Pedestrians walking to or from Mukilteo Station or the surrounding neighborhoods would likely cross at this intersection. Vehicles unloading from the ferry or destined for the toll booths would pass through this intersection. Both the pedestrian and vehicle volumes are expected to be high at this location.

Pedestrians transferring to or from buses would have no interaction with vehicles and would have a direct connection between the passenger terminal and bus bays.

Other conflict points occur at the entrance and exit of the parking lot and the bus bays. These points would have relatively low vehicle volumes.

New overhead lighting would also be developed along First Street and for the terminal facilities, including the vehicle holding area, the commuter rail parking area, and the new bus bays.

3.5.2 Bicycle Facility Conditions

The addition of bicycle lanes to the roadway network varies by Build alternative. Under all alternatives, bicycles crossing the SR 525 bridge would share the lane with

vehicle traffic, similar to existing conditions. Bicyclists would continue to use the vehicle toll booths to pay their ferry fare.

No-Build Alternative

The manner in which bicycles arrive at the Mukilteo ferry terminal, are processed through the toll booths, are directed to the managed holding area lanes, and are loaded onto the ferry for the No-Build Alternative would remain the same as existing conditions.

Preferred Alternative

This alternative would provide an eastbound bicycle lane on First Street between SR 525 and the west transit center driveway. A westbound bicycle lane would be provided from the transfer span to First Street along the terminal area exit lanes. A westbound bicycle lane would be provided along the terminal area exit lanes to First Street and continue east to SR 525.

Existing Site Improvements Alternative

Bicycle facility conditions for this alternative are similar to the No-Build Alternative.

Elliot Point 1 Alternative

This alternative would provide bicycle lanes in both directions along First Street between SR 525 and the Mount Baker crossing. Bicyclists would share a travel lane with vehicles accessing the toll booths and when unloading from the ferry west of the Mount Baker crossing. A bicycle lane would be provided in the holding area for bicyclists to bypass queuing ferry traffic and reach a staging area. Bicyclists would be able to share the lanes with vehicle traffic or use the designated HOV lane.

3.5.3 Non-Motorized Volumes and Destinations

This section summarizes the pedestrian and bicycle volume changes during the PM peak hour for the No-Build Alternative and Build alternatives. Pedestrian volumes are projected to increase during the PM peak period. In 2040, during the PM peak hour, a projected 456 people would walk and 5 people would bike to the Mukilteo ferry terminal from area destinations. The number of people arriving from Clinton in Mukilteo is significantly lower, with approximately 36 people walking and 1 person bicycling from the ferry.

No-Build Alternative

Pedestrians and bicyclists would follow the same routes as they do today (see Exhibits 3-35 and 3-36).

Exhibit 3-35. 2040 PM Peak Hour Inbound Non-Motorized Volume Flows – No-Build Alternative

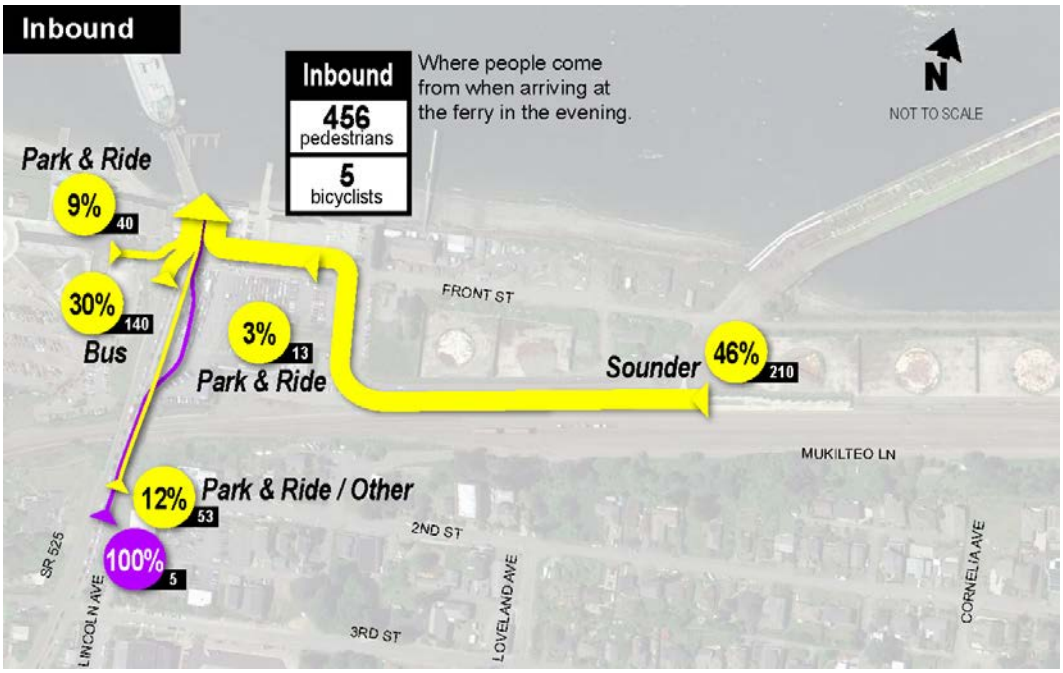


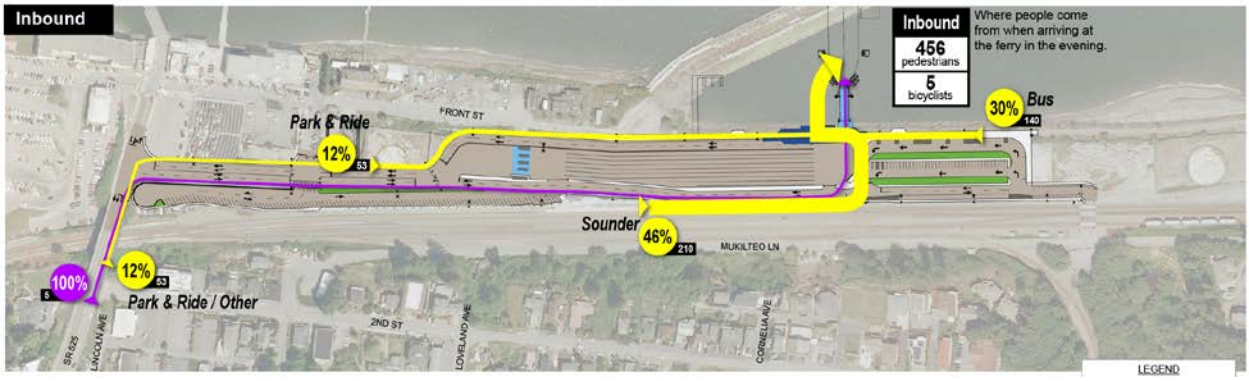
Exhibit 3-36. 2040 PM Peak Hour Outbound Non-Motorized Volume Flows – No-Build Alternative

Preferred Alternative

Exhibit 3-37 illustrates inbound pedestrian and bicycle flows. The largest pedestrian flows would be on the east end of the waterfront promenade and the south side of First Street connecting the bus bays and Mukilteo Station with the terminal. Pedestrian flows from the surrounding neighborhoods would travel across the SR 525 bridge, over the BNSF tracks, and along the south side of First Street, passing by Mukilteo Station. Bicycles would follow a similar path, but enter the holding area via the toll booths off First Street.

The west end of the waterfront promenade could be used by pedestrians accessing the Mukilteo ferry terminal because access to ferry walk-on passengers would be provided to the two-story passenger building.

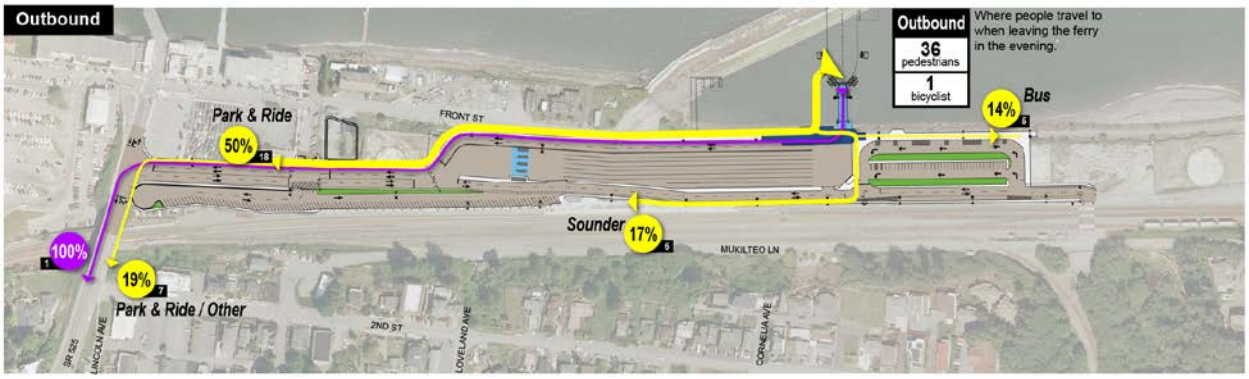
Exhibit 3-37. 2040 PM Peak Hour Inbound Non-Motorized Volume Flows – Preferred Alternative



Outbound trips shown in Exhibit 3-38 are primarily oriented west of the terminal with over 85 percent of pedestrians traveling along the sidewalks on either the north or south side of First Street. Pedestrians heading to parking in the vicinity of SR 525 are expected to travel on the north side of First Street and pedestrians heading to the surrounding neighborhoods would travel on the south side of First Street.

Bicyclists are expected to travel along the north side of the holding area exit lanes to the bicycle lanes provided on First Street at the toll booth entrance. After merging onto First Street, bicyclists would turn left at SR 525.

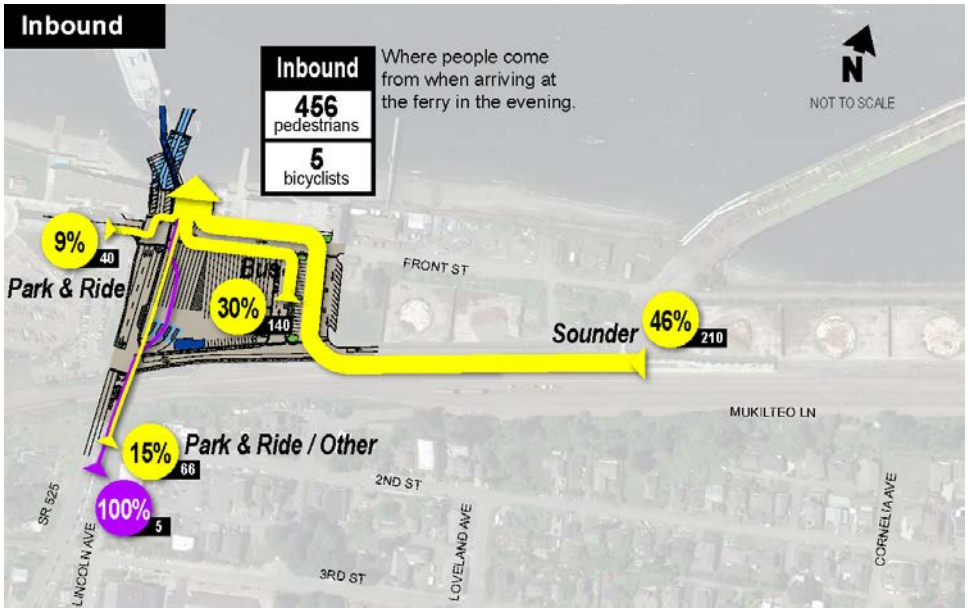
Exhibit 3-38. 2040 PM Peak Hour Outbound Non-Motorized Volume Flows – Preferred Alternative



Existing Site Improvements Alternative

This alternative would relocate the passenger building and the transit center, which changes how people travel to and from the Mukilteo ferry terminal. Exhibit 3-39 illustrates how people would walk and bike to the Mukilteo ferry terminal during the 2040 PM peak period. Most people travel to the Mukilteo ferry terminal from destinations east of SR 525, which includes Mukilteo Station, the transit center, and passenger pick-up/drop-off areas. People arriving at the Mukilteo Station and the transit center would likely concentrate their travel on the west side of Park Avenue and the north side of Front Street (the pedestrian walkway on the south side of Front Street would be retained, but is less favorable during ferry vehicle loading). Approximately 24 percent of walk-on passengers are forecasted to access the Mukilteo ferry terminal along SR 525 and areas to the west (most of these passengers would be using park-and-ride facilities).

Exhibit 3-39. 2040 PM Peak Hour Inbound Non-Motorized Volume Flows – Existing Site Improvements Alternative



Bicyclists traveling to the Mukilteo ferry terminal would pass through the SR 525/First Street intersection and enter the holding area.

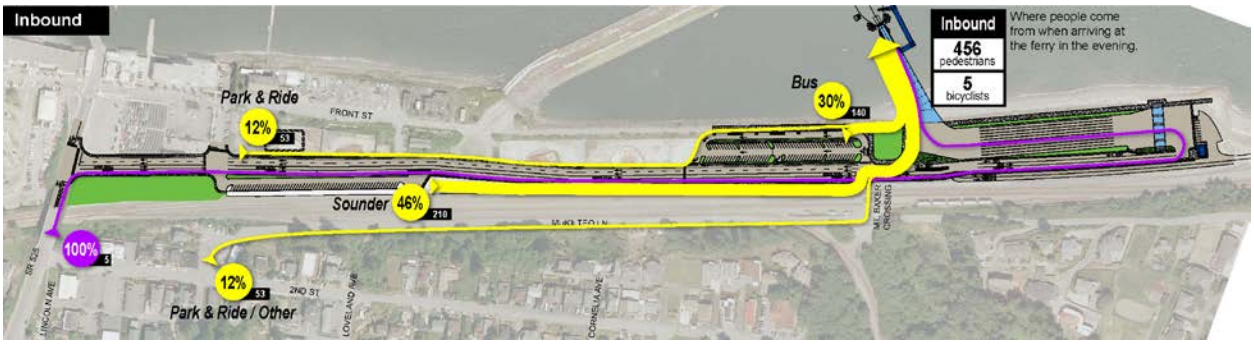
Exhibit 3-40 illustrates how people would walk and bike to the Mukilteo ferry terminal during the 2040 PM peak period. The walk-off passenger flows in the outbound direction would be less than 10 percent of the inbound walk-on flow. These flows would be evenly split between the east and west side of SR 525. Passengers who walk off the ferry and then leave using their car parked nearby would make up the largest share of pedestrians, at 50 percent of outbound passengers. The remaining walk-off passengers would either walk south across the SR 525 bridge to the surrounding areas, the bus bay, or Mukilteo Station. Bicycle flows would be entirely on SR 525.

Exhibit 3-40. 2040 PM Peak Hour Outbound Non-Motorized Volume Flows – Existing Site Improvements Alternative

Elliot Point 1 Alternative

As illustrated in Exhibit 3-41, inbound trips would be highest from the bus bays to the terminal and from Mukilteo Station to the terminal. Other pedestrian trips would be evenly distributed onto the north side of First Street and the new Mount Baker crossing and Mukilteo Lane. Approximately 58 percent of the pedestrians would pass through the intersection of First Street and Mount Baker crossing. Bicycle flows would travel the entire length of First Street to access the tollbooths at the eastern end of the project area.

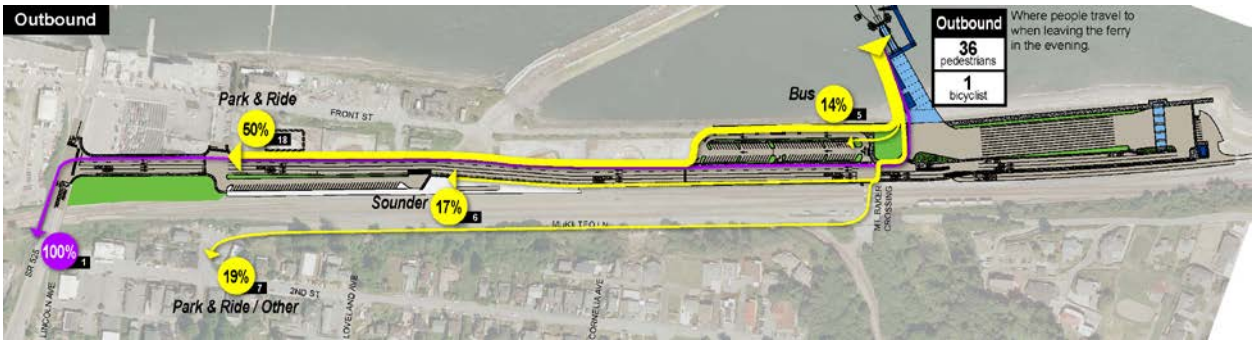
Exhibit 3-41. 2040 PM Peak Hour Inbound Non-Motorized Volume Flows – Elliot Point 1 Alternative



Outbound pedestrian flows shown in Exhibit 3-42 would be concentrated along the northern sidewalk on First Street heading to parking located in the vicinity of SR 525. Over 85 percent of trips must travel greater than 0.34 mile on First Street or Mukilteo Lane to arrive at their destination. Trips to the surrounding neighborhoods

or Mukilteo Station, which represent close to 40 percent of the trips, branch off immediately after exiting the terminal building and travel through the east driveway/First Street intersection near the Mount Baker crossing. Bicycle flows would be primarily on First Street and are expected to cross the BNSF tracks at SR 525.

Exhibit 3-42. PM Peak Hour Outbound Non-Motorized Volume Flows – Elliot Point 1 Alternative



3.5.4 Pedestrian Connections

Exhibits 3-43 through 3-46 show the distance and estimated average time for pedestrians to walk to and from the terminal and common destinations in the project vicinity. The average walk time to the Mukilteo ferry terminal does not include the time to purchase a ticket or the time to travel from the passenger building to the ferry. The average walk time from the Mukilteo ferry terminal includes the time to exit the ferry via the overhead loading ramps to calculate the connection time (walk times) to other modes.

Exhibit 3-43. Pedestrian Pathways and Walk Distances to the Mukilteo Ferry Terminal

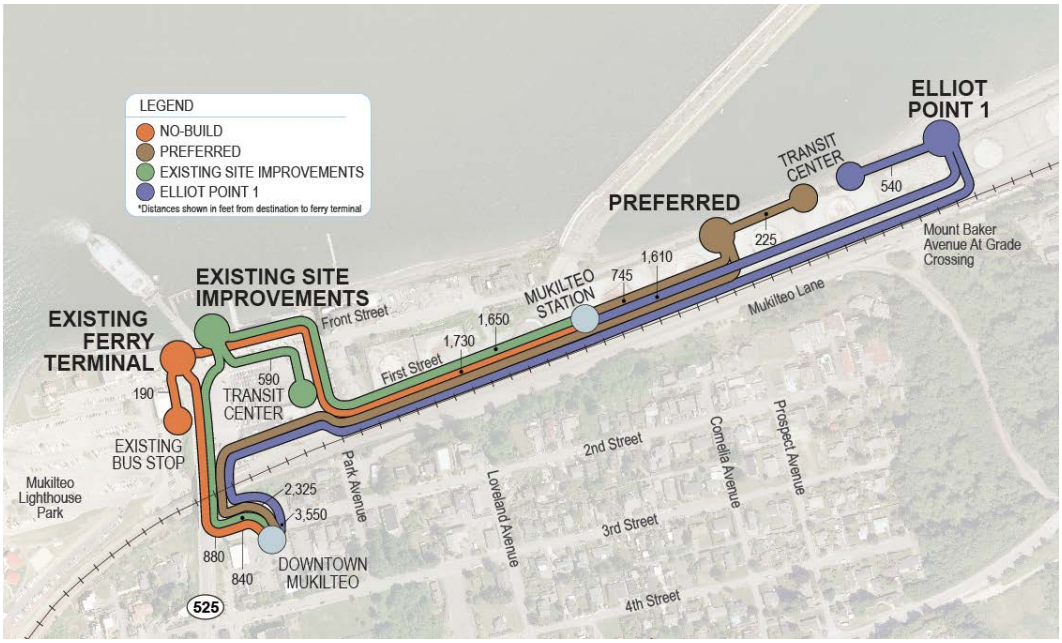


Exhibit 3-44. Estimated Walk Distances

Alternative	Mukilteo Station to Passenger Building (feet)	Ferry to Mukilteo Station (feet)	Bus Stop / Transit Center to Passenger Building (feet)	Ferry to Bus Stop /Transit Center (feet)	Second Street to Passenger Building (feet)	Ferry to Second Street (feet)	Between Bus Stop / Transit Center and Mukilteo Station (feet)
Existing/ No-Build	1,730	1,960	190	430	880	1,120	1,850
Preferred	745	1,040	225	545	2,325	2,660	970
Existing Site Improvements	1,650	2,040	590	990	840	1,240	1,190
Elliot Point 1	1,610	1,970	540	900	3,550	3,920	1,080

Note: The walk distance from the ferry is longer than to the ferry because it includes the distance of traveling from the passenger building to the ferry, which is important for determining connectivity between modes.

Exhibit 3-45. Walk Travel Times to the Mukilteo Ferry Terminal (2040 PM Peak)

Alternative	Mukilteo Station to Passenger Building (minutes)	Bus Stop/ Transit Center to Passenger Building (minutes)	Second Street to Passenger Building (minutes)	Between Bus Stop/Transit Center and Mukilteo Station (minutes)
Existing	8.6	1.0	3.5	9.3
No-Build	8.9	1.0	3.6	9.7
Preferred	3.8	0.9	11.1	4.9
Existing Site Improvements	8.5	3.0	4.6	6.1
Elliot Point 1	8.3	2.5	15.8	5.6

Exhibit 3-46. Walk Travel Times from the Mukilteo Ferry Terminal (2040 PM Peak)

Alternative	Ferry to Mukilteo Station (minutes)	Ferry to Bus Stop /Transit Center (minutes)	Ferry to Second Street (minutes)
Existing	10.4	2.0	6.3
No-Build	10.6	2.1	6.6
Preferred	5.2	2.3	12.8
Existing Site Improvements	10.0	4.7	6.4
Elliot Point 1	10.3	4.8	17.8

No-Build Alternative

Pedestrian walk times under the No-Build Alternative would be similar to existing conditions. While walk times to the ferry would be similar to existing conditions, walk times from the ferry could increase due to higher pedestrian volumes leaving the ferry (see Exhibits 3-45 and 3-46 for the No-Build Alternative). Because the intersections remain stop-controlled, pedestrians would have the right-of-way when crossing the SR 525/Front Street and Park Avenue/Front Street intersections. Increases in walk time are important to consider because they describe the ability for people to make timely transfers between travel modes.

Preferred Alternative

This alternative would relocate the Mukilteo ferry terminal to the western portion of the Mukilteo Tank Farm, which changes how ferry passengers would arrive and depart from the Mukilteo ferry terminal (see Exhibit 3-2). People walking from Mukilteo Station would likely use the new sidewalk along the First Street extension and cross into the Mukilteo ferry terminal at the proposed midblock crossing located at the west driveway/First Street intersection.

The average walk time from Mukilteo Station to the passenger building would be approximately 4 minutes (see Exhibit 3-45) and the return trip would be approximately 5 minutes (see Exhibit 3-46); both are more than 4 minutes shorter compared to the No-Build Alternative.

Pedestrians walking from the proposed transit center, located east of the ferry terminal, to the passenger terminal would travel along a walkway on Possession Sound's shoreline. Bus passengers would be provided with an overpass to cross the transfer span for access to the passenger terminal. Because the transit center would provide a long curb zone for buses to drop off passengers, the distance and associated walk time to the passenger building would depend on bus position. The average walk time from the transit center to the passenger building or from the ferry to the transit center would be slightly longer than the No-Build Alternative.

Pedestrians walking from Mukilteo would either cross the railroad using the SR 525 bridge or the existing at-grade Mount Baker crossing depending on their destination. This alternative would increase the walk time between the Second Street parking lot and the Mukilteo ferry terminal by more than 6 minutes because the walk distance would increase by approximately 1,400 feet.

Existing Site Improvements Alternative

This alternative would change the location of the passenger building entrance from the northwest corner of the SR 525/Front Street intersection to the northeast corner, incorporate overhead passenger loading, and construct a new transit center east of the holding area.

As shown in Exhibit 3-45, walk times for pedestrians traveling to the passenger building from Mukilteo Station would decrease. Because the passenger building would be relocated to the east side of the SR 525/Front Street intersection, pedestrians walking from Mukilteo Station would no longer have to wait for the ferry vehicle loading and unloading process. The walk time between the transit center and Mukilteo Station would be reduced by approximately 3 minutes (see Exhibit 3-45), while the walk time between the transit center and the passenger building would increase by approximately 2 minutes. As shown in Exhibit 3-46, travel times for pedestrians traveling to the Second Street parking area from the Mukilteo ferry terminal would increase compared to the No-Build Alternative.

The delay to pedestrians when crossing local intersections and ferry vehicle unloading/loading would increase because of traffic growth and the additional unload/load time for the 144-vehicle ferries (compared to the existing 124-vehicle ferries).

Elliot Point 1 Alternative

The average walk time between Mukilteo Station and the Mukilteo ferry terminal would increase because of the longer distance, but pedestrians would have improved facilities and fewer potential conflicts with vehicles (see Exhibits 3-45 and 3-46).

Pedestrians walking from the proposed transit center, located west of the ferry terminal, to the passenger terminal would travel along a walkway on Possession Sound's shoreline. Bus passengers would not have to cross vehicle traffic to access the passenger terminal because it would be located on the western edge of the ferry dock. Because the transit center would provide a long curb zone for buses, the distance and associated walk time to the passenger building would depend on bus position.

Some people who work, live, or park their vehicles in the pay-to-park lots south of Second Street would likely use Mukilteo Lane and cross the railroad tracks at the existing Mount Baker crossing. The average walk time from these parking lots to the passenger building would be approximately 16 minutes, and from the ferry to the Second Street park-and-ride lot would be approximately 18 minutes. The increase in walk time for both directions would be about 11 minutes because the distance between these connections would increase by more than 2,600 feet (see Exhibits 3-43 and 3-44).

3.5.5 Non-Motorized Safety

An important non-motorized safety consideration is the number of locations where people must share travel space or cross another travel mode path, which are referred to as conflict areas. This section summarizes safety considerations for the multimodal connections surrounding the Mukilteo ferry terminal for people walking and bicycling. *Section 3.3.9* includes a summary of safety issues related to pedestrians and bicycles at the ferry terminal.

No-Build Alternative

No changes would be made to the pedestrian or bicycle environment. *Section 3.5.1* describes safety improvements for a new passenger building and modifications to vehicle control on the transfer span.

Preferred Alternative

Safety concerns for pedestrians in relation to sidewalk connectivity and vehicular conflicts would be reduced with this alternative for some people. Bus passengers would not cross any roadways between the transit center and the Mukilteo ferry terminal. Pedestrians connecting between Mukilteo Station and the ferry would cross First Street where vehicle volumes are lower (they would not have to cross ferry

loading and unloading traffic). Bus passengers would have no conflicts with vehicular traffic.

Sounder passengers would have a good connection between the terminal and Mukilteo Station with one crossing of First Street. This crosswalk would be unsignalized and have low vehicle volumes and a short crossing width. Other pedestrian-vehicle conflicts could occur at new signalized intersections on First Street, but generally would have low pedestrian volumes.

This alternative introduces conflicts between pedestrians and train traffic at the new at-grade Mount Baker crossing of the BNSF tracks. This crossing has three active tracks and would provide pedestrians with the option to travel along Mukilteo Lane, which has no non-motorized facilities.

This alternative would provide sidewalks along both sides of First Street, the public and employee parking lot, and other areas around the passenger terminal.

Existing Site Improvements Alternative

This alternative includes overhead passenger loading, which would reduce conflict between pedestrians and vehicles during the ferry loading/unloading process and maintain adequate ADA grade connections between the passenger building and the ferry.

Pedestrians connecting between the transit center and the ferry would still have to cross Front Street, but they could cross at the Front Street/Park Avenue intersection, which is less congested than the SR 525/Front Street intersection. Pedestrians connecting between Mukilteo Station and the ferry would cross First Street and Front Street at locations where vehicle volumes and speeds are low. This alternative includes a signalized crossing of SR 525 at First Street, which would reduce conflicts and ease crossing.

Sidewalk completeness and quality would remain similar to existing conditions.

Elliot Point 1 Alternative

This alternative has similar pedestrian-vehicle conflicts to the Preferred Alternative, except pedestrians connecting between Mukilteo Station and the Mukilteo ferry terminal would cross at the signalized Mount Baker crossing/First Street intersection. With high vehicle and pedestrian volumes crossing paths at this intersection, the chance of collision would increase, especially for train passengers who may be rushing to catch a train and may not follow the intersection controls.

This alternative introduces conflicts between pedestrians and train traffic at the new at-grade Mount Baker crossing of the BNSF tracks. This crossing has three active tracks and would require pedestrians to travel along Mukilteo Lane, which has no non-motorized facilities.

This alternative would provide sidewalks along both sides of First Street, the public and employee parking lot, and other areas around the passenger terminal.

3.6 PUBLIC TRANSPORTATION

Through 2040 and for all alternatives under consideration, Community Transit, Everett Transit, Island Transit, and Sound Transit are anticipated to continue providing bus and rail transit service connecting to the Mukilteo-Clinton ferry route. This section describes changes to transit operation, bus zones, bus layover, and operations.

3.6.1 Transit Serving Mukilteo Terminal

For all Build alternatives, an improved bus stop area is proposed that would meet ADA requirements. Proposed signalized intersections in the Build alternatives would include transit signal priority, which adjusts signal operation to favor transit movements when a bus is present. Transit signal priority would reduce the amount of delay buses could incur at intersections, and if programmed aggressively, would provide a green light for buses approaching an intersection most of the time.

All 2040 alternatives assumed bus headways were the same as existing schedules, because the transit agencies do not have specific plans for adjusting schedules in the future. For an estimate on the average number of people boarding buses (transit load factor) see *Section 3.6.4*. For a summary of walk times between the transit center, Mukilteo ferry terminal, Mukilteo Station, and Mukilteo, see *Section 3.5.4*.

No-Build Alternative

Access to the Mukilteo ferry terminal and the performance of transit facilities would remain essentially unchanged as shown by the transit travel time in Exhibit 3-47. The travel time between Second Street and the existing bus stop at the SR 525/Front Street intersection would be the same. Although it would be expected that the travel time would increase because of additional background traffic, the addition of the northbound right-turn lane would reduce congestion at the SR 525/Front Street intersection. The two existing bus bays would remain at the same location near the SR 525/Front Street intersection. Access to Mukilteo Station would remain unchanged.

The City of Mukilteo expressed concern over transit operators continuing to lay over at Mukilteo Lighthouse Park; this may be restricted in the future. Operating issues identified for existing conditions, such as inadequate bus stop size and difficulty turning buses around in Mukilteo Lighthouse Park would still occur for this alternative (see *Section 2.4.5*). These operating issues affect the ability for buses to start service on schedule, which negatively affects schedule reliability and the ability for other passenger to make connections.

Exhibit 3-47. Transit Travel Times Serving Mukilteo Ferry Terminal (PM Peak Period)

Alternative	From First Street to Bus Stop/ Transit Center (minutes)	From Bus Stop/Transit Center to First Street (minutes)
Existing	0.6	0.2
No-Build	0.6	0.2
Preferred	1.7	1.8
Existing Site Improvements	0.6	0.9
Elliot Point 1	1.4	1.8

Note: These transit travel times do not include additional time to service other stops along First Street proposed in *Chapter 7*.

Preferred Alternative

A new transit center on the waterfront east of the new terminal would have six bus bays and passenger amenities including a waterfront promenade, benches, shelters, passenger information, and lighting. This transit center would serve scheduled routes and provide paratransit service. The facility would meet Everett Transit and Community Transit bus zone and layover space requirements.

This alternative would relocate the current bus stops at SR 525/Front Street intersection to the new transit center. This relocation would increase the walking distance to Mukilteo Lighthouse Park and businesses along Front Street. The potential for providing additional bus zones on First Street east of the ferry holding area access intersection is discussed in *Chapter 7 Mitigation*.

Buses traveling to the transit center would turn right at the proposed SR 525/First Street intersection using the inside lane. Buses would travel east on First Street and enter the transit center through a transit-only driveway. Transit signal priority would be provided at intersections along First Street; however, transit signal priority would not interrupt ferry vehicle unloading and may be of limited use where nearside bus stops are located.

Layover for approximately three buses would be provided on the south side of First Street across from the transit center. Because the transit center is farther than the existing stop location and buses pass through two new signals, the route time would increase by 1.1 minutes to the transit center and by 1.6 minutes away from the transit center compared to the No-Build Alternative (see Exhibit 3-47).

The transit center would be located approximately 770 feet closer to Mukilteo Station than the existing SR 525 bus stops near Front Street (see Exhibit 3-43). Sounder passenger pick-up/drop-off would likely occur in the revised Mukilteo Station parking lot or in-lane along First Street.

Existing Site Improvements Alternative

A new transit center east of the holding lanes would include a ferry employee parking lot in between the bus stops. The transit center would serve scheduled bus routes. Paratransit service would use parking spaces on Front Street. The facility could include passenger amenities such as benches, shelters, passenger information, and lighting. Space for six bus bays would also be provided at the transit center. Because the site is constrained, only some of the buses would be able to depart before the bus in front departs.

Buses would enter the transit center (traveling to the Mukilteo ferry terminal) by turning right at the proposed SR 525/First Street intersection from the inside lane (bypassing any ferry queuing) and then turning left west of Park Avenue. Passenger drop-off would occur on both sides of the transit center; the eastern edge of the transit center is Park Avenue. To access layover, buses would circulate through the transit center and lay over against the eastern edge of the holding lanes where a fence would separate the transit center from the Mukilteo ferry terminal. Buses leaving the transit center would exit on Park Avenue and turn left, assisted by transit signal priority, at the proposed SR 525/First Street intersection. Because the transit center would be slightly farther than the existing stop location and because buses pass through a new signal, the route time would increase by 0.7 minute compared to the No-Build Alternative when traveling away from the transit center (see Exhibit 3-47). The Park Avenue/First Street intersection was used as the reference point for determining transit travel times.

The transit center would be closer to Mukilteo Station than the existing SR 525 bus stops near Front Street by approximately 700 feet (see Exhibit 3-43). The facility would meet Everett Transit and Community Transit bus zone and layover space requirements. This alternative would have no impact on the Mukilteo Station parking area or passenger pick-up/drop-off area.

Elliot Point 1 Alternative

A new transit center on the waterfront west of the new terminal would have six bus bays and passenger amenities, including a waterfront promenade, benches, shelters, passenger information, and lighting. This transit center would serve scheduled routes and provide paratransit service. The facility would meet Everett Transit and Community Transit bus zone requirements, but separate layover space is not included on site.

This alternative would relocate the current bus stops at the SR 525/Front Street intersection to the new transit center. This relocation would increase the walking distance to Mukilteo Lighthouse Park and businesses along Front Street. The potential for providing additional bus zones on First Street near Park Avenue is discussed in *Chapter 7 Mitigation*.

Buses traveling to the transit center would turn right at the proposed SR 525/First Street intersection using the inside lane. Buses would travel east on First Street and enter the transit center through the east driveway/First Street intersection. The east driveway is also used by WSF employees, the public, and ferry passengers to access a parking lot. Transit signal priority would be provided at intersections along First Street; however, transit signal priority would not add time to the ferry vehicle unloading process. Because the transit center is farther than the existing stop location and because buses pass through three new signals, the route time would increase by 0.8 minutes to the transit center and by 1.6 minutes away from the transit center compared to the No-Build Alternative (see Exhibit 3-47).

The transit center would be located approximately 290 feet closer to Mukilteo Station than the existing SR 525 bus stops near Front Street (see Exhibit 3-43). This alternative would not affect the Mukilteo Station parking lot (see *Section 3.7.1*) because the roadway would be modified and the existing pick-up/drop-off area would be eliminated.

3.6.2 Transit Serving Clinton Terminal

Island Transit is anticipating continuation of transit service to the Clinton ferry terminal and the potential for increased peak period service to accommodate the growing demand. As part of Island Transit's strategy for improved transit service connections, they are planning to expand the size of existing park-and-ride lots and evaluate additional park-and-ride lot locations along the SR 525 corridor.

3.6.3 Schedule Alignment and Reliability

To improve the competitiveness of transit as a mode of choice for travelers, transit agencies attempt to schedule their bus and rail service to match high-demand locations, such as a ferry terminal. For multimodal transit centers it is important to consider the following:

- Coordinating schedules with transit providers
- Improving travel time reliability
- Connecting between transit services

Coordinating Schedules

WSF anticipates the Mukilteo-Clinton ferry schedule would not change with either the No-Build Alternative or Build alternatives. Community Transit, Everett Transit, and Island Transit could increase the number of buses serving key routes with additional capital and operations funding. This could improve the frequency of buses and reduce the wait time between buses.

Improving Travel Time Reliability

Transit agencies responsible for providing bus-based service often work with local jurisdictions to improve bus travel time reliability by installing transit signal priority and bus lanes. Roadway congestion can be difficult to predict and is a problem experienced by most transit providers when developing route schedules. Improvements that reduce delay to transit from congestion can improve schedule reliability and potentially reduce bus operation costs. To assist transit movements to the Mukilteo ferry terminal, all proposed signalized intersections would include transit signal priority. Another way to increase schedule reliability is to increase the number of buses serving a route during heavily congested times of the day, but this option would require additional capital and operations funding.

An impact on bus travel time (not necessarily reliability) is the increased distance buses would travel with the Preferred, Existing Site Improvements, and Elliot Point 1 alternatives, compared to existing conditions. The Build alternatives would benefit transit operations by eliminating bus route delay from ferry loading operations, providing adequate space to accommodate bus stops, allowing for layover (except Elliot Point 1), and providing internal transit circulation compared to existing conditions.

Sounder commuter rail is not subject to road-based congestion because of its grade-separated right-of-way and the provision of rail preemption where the rail line crosses roadways at grade. Rail schedule reliability would not be affected by the No-Build Alternative or Build alternatives.

Connecting Between Transit Services

The distance people have to travel between transit services and the facility available to complete the connections are also important considerations in schedule alignment. As shown in Exhibits 3-44 and 3-45, most of the walk times between the Mukilteo ferry terminal and destinations such as Mukilteo Station and the transit center would increase for the Existing Site Improvements and Elliot Point 1 alternatives. Walk travel times would generally be shorter for the Preferred Alternative. The differences in travel time between the alternatives would be less than 2.4 minutes, which would have little impact on connections between transit services. Both the Preferred and Elliot Point 1 alternatives would increase the walk travel time from the Mukilteo ferry terminal and downtown Mukilteo.

3.6.4 Average Passenger Loads

Year 2040 average passenger loads were estimated for transit routes serving the Mukilteo and Clinton ferry terminals for a PM peak period from 3:00 PM to 7:00 PM. A load factor of 1.0 indicates all seats on the bus are occupied and a load

factor exceeding 1.5 indicates a bus has more than the desirable maximum number of passengers. When buses approach or exceed load factors of 1.5, additional passengers typically cannot board unless other passengers disembark.

Mukilteo Terminal Average Passenger Loads

Exhibit 3-48 summarizes the existing and projected average 2040 ridership and load factors, the number of buses serving the Mukilteo ferry terminal, and coach type (load factors are calculated based on an assumed seat capacity for the coach type). As shown in Exhibit 3-48, the average load factor increases slightly for most routes because of the growth in passenger ridership. However, even with projected transit growth, the current bus service could accommodate future passenger demands for Mukilteo service in the evening.

Exhibit 3-48. Projected 2040 Transit Average Passenger Loads (Arriving at Mukilteo between 3:00 PM and 7:00 PM)

Ridership and Load Factor	Transit Route Number					
	417	880	113	190	70	18
2010 Ridership	30	23	35	11	84	49
2010 Load Factor	0.19	0.11	0.09	0.07	0.39	0.13
2040 Ridership	35	75	65	22	179	163
Estimated 4-Hour Bus Service	5	5	10	4	4	9
Coach Type	60-foot	60-foot	40-foot	40-foot	40-foot	40-foot
Seat Capacity	60	60	40	40	40	40
Estimated 2040 Load Factor	0.12	0.25	0.16	0.14	1.12	0.45

Routes serving major employers, such as Route 70 which serves Boeing, may experience a concentration in ridership at the close of business or shift turnover. In Exhibit 3-48, transit load factors are calculated by distributing growth over all bus trips within the 4-hour period. Individual buses may experience much higher load factors. For example, Route 70 is projected to more than double ridership from 2010 to 2040 (a 114 percent increase). If this percentage increase was applied to existing load factors that were recorded for each bus trip, the scheduled 4:23 PM bus would have a load factor of 2.0 with a 40-foot coach and 1.33 with a 60-foot coach (37 passengers were recorded on the existing 4:23 PM bus arriving at the Mukilteo ferry terminal, which could increase to approximately 80 passengers in 2040).

Clinton Terminal Average Passenger Loads

Exhibit 3-49 summarizes the existing and projected 2040 ridership and load factors, the number of buses serving the Clinton ferry terminal, and coach type (load factors are calculated at 1.0 times the seat capacity for the coach type). As shown in

Exhibit 3-49, the average load factor increases for all routes because of the growth in passenger ridership.

Exhibit 3-49. Projected 2040 Transit Average Passenger Loads (Departing Clinton between 3:00 PM and 7:00 PM)

Ridership and Load Factor	Transit Route Number		
	1	7	8
2010 Ridership	198	121	25
2010 Load Factor	0.64	0.40	0.19
2040 Ridership	533	351	56
Estimated 4-Hour Bus Service	8	8	3
Coach Type	40-foot	40-foot	40-foot
Seat Capacity	40	40	40
Estimated 2040 Load Factor	1.67	1.10	0.47

With projected transit growth, the current bus service could accommodate future passenger demands for Clinton service in the evening, except for Route 1 which has an estimated load factor of 1.67 in 2040. A load factor greater than 1.5, such as Route 1, indicates the potential need for additional buses or larger coaches during the PM peak period.

3.6.5 Public Transportation Safety

No-Build Alternative

The public transportation safety elements discussed under existing conditions for the Mukilteo ferry terminal are the same for the No-Build Alternative.

Preferred and Elliot Point 1 Alternatives

Under these alternatives, pedestrians walking between the Mukilteo ferry terminal and the transit center would not have to cross vehicle traffic (either in the holding area or local roadway), which would eliminate pedestrian-vehicle conflicts. The transit center, local roadways, and intersection would provide adequate lighting to discourage criminal activity.

Existing Site Improvements Alternative

This alternative would relocate and reconstruct the transit center, which would be designed to increase passenger safety with adequate lighting, clearly marked crossing locations, and a shelter. Overhead passenger loading would separate the pedestrian and vehicle loading and unloading processes, which would improve safety at the

Mukilteo ferry terminal. Also, overhead passenger loading would maintain adequate ADA grades.

3.7 PARKING

3.7.1 Mukilteo Ferry Terminal Parking

No increase in paid parking space is projected for the No-Build Alternative and Build alternatives; therefore, on-street parking restrictions in Mukilteo were assumed to remain unchanged. Changes in parking by alternative are shown in Exhibit 3-50. The projected increase in ferry-related park-and-ride demand from 2010 to 2040 was 43 percent or an additional 62 vehicles. Based on a survey of how many spaces are typically occupied, adequate capacity would exist to accommodate this increase in demand.

Exhibit 3-50. Parking Space Change by Alternative

		No-Build	Preferred	Existing Site Improvements	Elliot Point 1	
PARKING LOT	Parking Location		Number of Spaces			Notes
A	Southwest corner of SR 525 and Front Street	98	109	109	109	Off-Street private lot / paid (total does not include 5 vendor and 6 unmarked stalls)
B	Second Street between SR 525 and Park Avenue	40	40	40	40	Off-Street private lot / paid
C	Former Buzz Inn property (southwest corner of Front Street and Park Avenue)	n/a	n/a	n/a	n/a	This 45-space lot for Ivar's Mukilteo Landing is not included in totals because its use would be displaced
D	Port of Everett Mount Baker Terminal	30	30	30	33	Combined Port of Everett and public lot
E	Mukilteo Station Parking	63	63	63	59	Sound Transit park-and-ride lot
K	New Lot at Terminal	--	--	--	43	Off-Street public lot
	Subtotal	231	242	242	284	
	Net change compared to No-Build		11	11	53	
ON-STREET/GENERAL PUBLIC PARKING						
F	First Street between SR 525 and Park Avenue	25	43	0	0	On-street / time restrictions / parking passes
G	Park Avenue between Front Street and First Street	18	17	13	12	On-street / time restrictions / parking passes
H	Front Street between SR 525 and Park Avenue	26	26	26	26	On-street / time restrictions / parking passes
	Subtotal	69	86	39	38	
	Net change compared to No-Build		17	-30	-31	
	Total Parking Lot and On-Street Parking Spaces	**300**	**328**	**281**	**322**	
	Net change compared to No-Build		**28**	**-19**	**22**	
WSF PARKING						
I	WSF employee parking	20	40	40	40	WSF employees only
J	WSF employee parking (at Mukilteo ferry terminal)	23	0	13	0	WSF employees only
	Subtotal	43	40	53	40	
	Net change compared to No-Build		-3	10	-3	

No-Build Alternative

This alternative would not change parking capacity near the Mukilteo ferry terminal (see Exhibits 3-50 and 3-51). The No-Build Alternative would provide slightly more than the minimum of 40 spaces needed for WSF employee parking.

Exhibit 3-51. No-Build Alternative Parking Area Map

Preferred Alternative

This alternative would increase the amount of public on-street and parking lot parking capacity by up to 28 spaces (see Exhibit 3-50).

On-Street Parking

This alternative would remove approximately 26 on-street parking spaces (see Exhibit 3-52) due to the widening and realignment of First Street. This would reduce the number of on-street parking spaces along Park Avenue and eliminate parking on First Street between SR 525 and Park Avenue. This action could place additional parking demand on parking spaces west of Park Avenue, but replacement parking would be provided in a new parking lot south of the First Street/Park Avenue intersection.

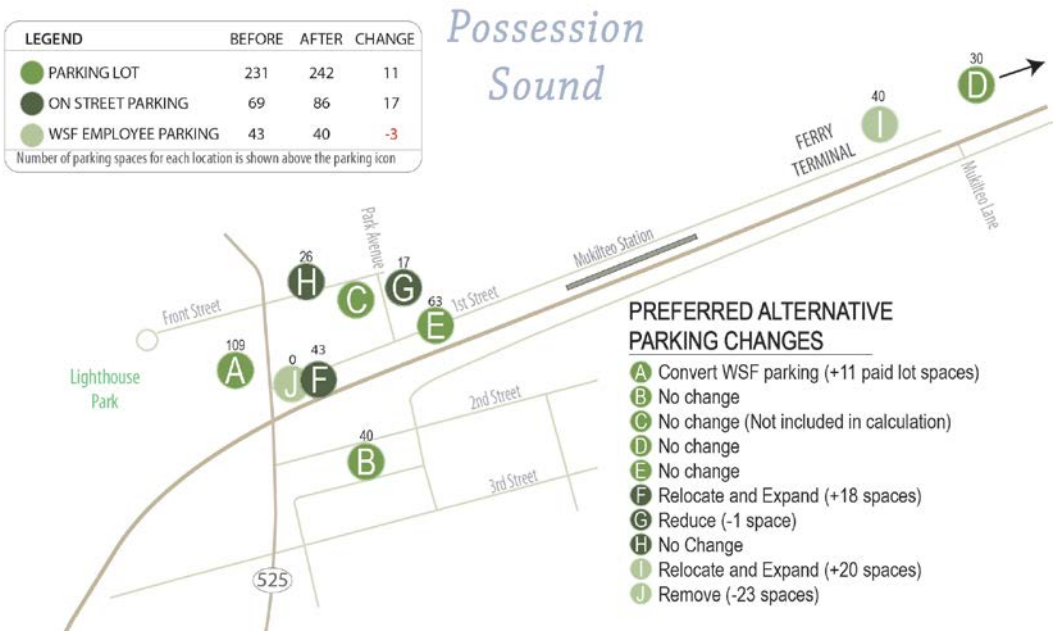
Parking Lots

The number of parking spaces provided in parking lots would increase by up to 54 spaces. A new parking lot would be provided to the west of the Sound Transit Mukilteo Station parking lot. In addition, the parking spaces at the Mukilteo ferry terminal would be signed and managed for WSF employee parking only.

The Preferred Alternative would increase the walk time from parking areas to the Mukilteo ferry terminal, such as the Second Street parking lot, by approximately 6 minutes compared to the No-Build Alternative. However, ferry riders affected by

this travel time increase represent a small portion of total ferry ridership. Potential business ramifications are discussed in *Chapter 4* of the Final EIS.

Exhibit 3-52. Preferred Alternative Parking Area Map



WSF Employee Parking

WSF employee parking would be co-located with the transit center east of the Mukilteo ferry terminal, and approximately 40 spaces would be provided. The remainder of the existing holding area and the existing WSF employee parking area would be vacated. There are 11 parking spaces adjacent to Mukilteo Lighthouse Park that WSF employees currently use, and those could be converted to regular lot spaces, which would expand that lot's capacity from 98 spaces to 109 spaces.

Existing Site Improvements Alternative

This alternative would reduce the amount of on-street and parking lot parking capacity by approximately 19 spaces (see Exhibit 3-50).

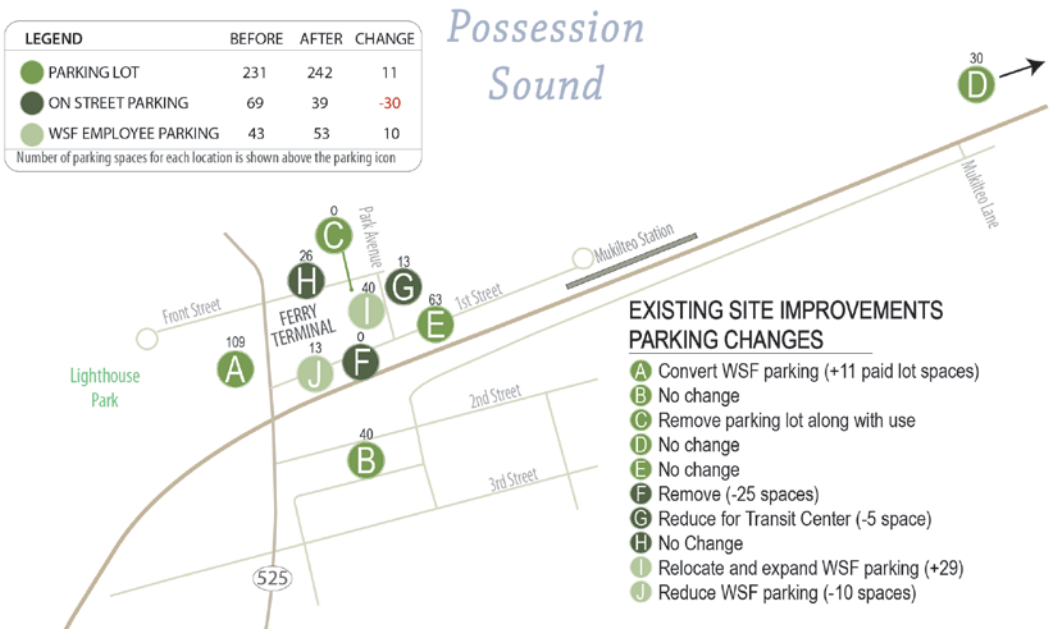
On-Street Parking

This alternative would reduce the amount of on-street parking spaces near the Mukilteo ferry terminal by approximately 30 spaces (see Exhibit 3-53).

Parking Lots

The parking capacity in lots would be increased by approximately 11 spaces. The removal of Ivar's restaurant would reduce parking demand in the area.

Exhibit 3-53. Existing Site Improvements Alternative Parking Area Map



WSF Employee Parking

Parking for ferry terminal employees would increase from 43 spaces to approximately 53 spaces; this amount exceeds the design criteria for 40 spaces. WSF currently uses 20 parking spaces in the existing parking lot (Lot A), but would no longer use them for employee parking; 11 parking spaces adjacent to Lighthouse Park would be converted to regular lot spaces, which would expand the parking lot (Lot A) from 98 spaces to 109 spaces. The other 9 spaces would likely revert to BNSF Railway use.

Elliot Point 1 Alternative

This alternative would increase the amount of on-street and parking lot parking capacity by approximately 22 spaces (see Exhibit 3-50).

On-Street Parking

The Elliot Point 1 Alternative would result in a net loss of approximately 31 on-street parking spaces (see Exhibit 3-54). The widening and realignment of First Street

would reduce the number of on-street parking spaces along Park Avenue and eliminate parking in the area between SR 525 and Park Avenue. The loss of on-street parking could place additional parking demand on parking spaces west of Park Avenue.

Although some of the on-street parking would be replaced with the new parking lot at the Mukilteo ferry terminal, those spaces would be over 2,000 feet east of the Park Avenue/First Street intersection. This could increase the walk time to destinations by approximately 8 to 9 minutes. Because this parking would be used to access local businesses and the shoreline, there would be little impact on ferry passengers.

Parking Lots

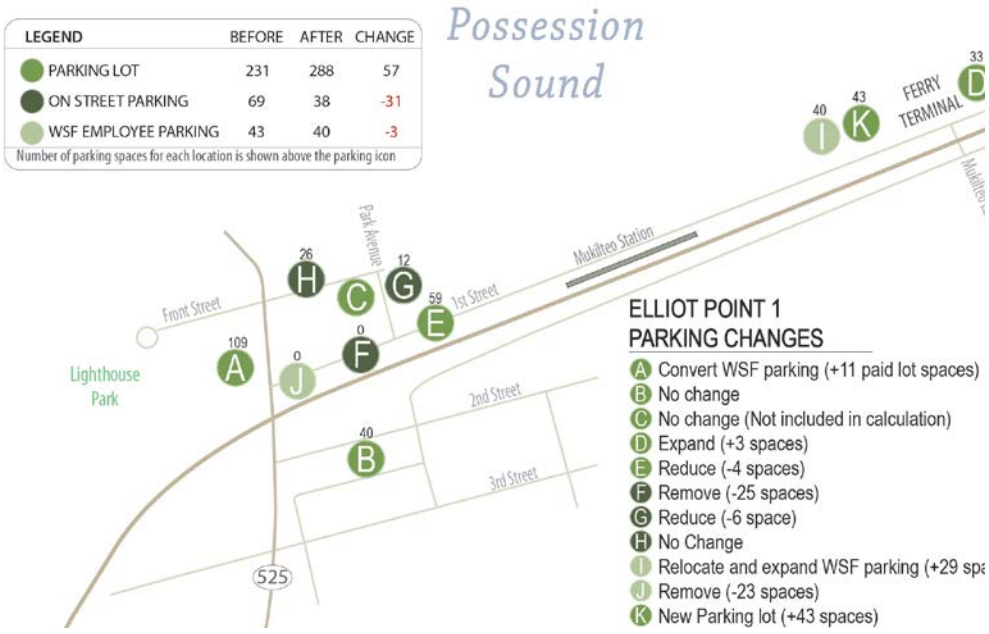
The number of parking spaces provided in parking lots would increase by approximately 53 spaces. To improve safety, the Mukilteo Station parking lot would be redesigned to switch the orientation of the parking stalls and improve the vehicle approach angle to the driveway exit onto First Street. This would result in a loss of approximately 4 parking spaces. A new public parking lot at the Mukilteo ferry terminal would be constructed west of the holding area and Japanese Creek. ADA-compliant parking spaces would be provided at the adjacent transit center. The terminal parking would replace some of the lost on-street and Mukilteo Station parking. The Mount Baker Terminal parking area would be improved and provide approximately 33 spaces for Port of Everett employees and the public. This area would retain parking spaces for the public to use when accessing the shoreline.

The Elliot Point 1 Alternative would increase the walk time from parking areas in Mukilteo, such as the Second Street parking lot, by approximately 11 to 12 minutes compared to the No-Build Alternative. However, ferry riders affected by this travel time increase represent a small portion of total ferry ridership. Potential business ramifications are discussed in *Chapter 4* of the Final EIS.

WSF Employee Parking

WSF employee parking would be provided in a new parking lot at the Mukilteo ferry terminal, which would have 40 spaces. The existing 11 parking spaces adjacent to Mukilteo Lighthouse Park would be converted to regular lot spaces, which would expand the existing parking lot. The other 9 spaces would likely revert to BNSF Railway use.

Exhibit 3-54. Elliot Point 1 Alternative Parking Area Map



3.7.2 Clinton

As part of Island Transit's strategy to improve transit service connections, they are planning to expand the size of existing park-and-ride lots, as well as evaluate additional park-and-ride locations along the SR 525 corridor.

3.7.3 Parking Safety

Safety issues within parking areas largely consist of parking area design and lighting, which will be considered further during the design process. Also, collisions within parking lots are typically less severe due to low vehicle speeds.

3.8 FREIGHT

3.8.1 Rail Operations

Rail operations would not be affected by any of the Build alternatives. The rail spur crossing Mukilteo Lane, which connects the Port of Everett and Paine Field, would experience an increased number of pedestrian crossings. However, it is used irregularly, and the indirect increase in foot traffic due to the opened shoreline access area would not affect rail operations.

3.8.2 Truck Freight

At the Mukilteo ferry terminal, truck freight traffic would continue to be directed to the designated holding area freight lanes for No-Build and Existing Site Improvements alternatives. These lanes permit trucks to load independently of other ferry vehicle traffic. For the Preferred and Elliot Point 1 alternatives, truck freight could be required to mix with other ferry traffic in the holding area during peak periods because there would be fewer lanes to manage. Truck freight traveling on SR 525 would experience longer travel times due to the increase in ferry vehicles; however, this delay would be short because most of the delay is associated with an increase in background (non-ferry-related traffic) volumes.

3.8.3 Airports

The Build alternatives are not proposing modifications to SR 525 south of First Street, which includes the section of SR 525 between Paine Field Boulevard and Harbour Pointe Boulevard. The modification to SR 525 occurs outside of the 2-mile radius, which requires coordination with the Federal Aviation Administration to ensure that airway-highway clearances are adequate. However, it is unlikely that any new roadway and transportation structures would be more than 200 feet in height above ground level.

3.8.4 Freight Safety

Freight vehicles require a larger turning radius compared to passenger vehicles, and collisions can occur with fixed objects or other vehicles when adequate turning radii are not available. For the No-Build and Existing Site Improvements alternatives, freight traffic would be required to perform the same two turns described in *Section 2.7.4*. The Preferred Alternative would stagger the eastbound through movements at the tollbooth entrance to ensure non-ferry vehicle traffic stop far enough back to provide adequate space for freight vehicles to complete the turn. Accessing the toll booths and holding area, as described for the Elliot Point 1 Alternative, would require freight trucks to perform a sharp left turn before approaching the toll booth. The configuration of lane stripes to direct vehicle traffic to the appropriate toll booth would be considered further during the design process.

4 CONSTRUCTION IMPACTS

This chapter describes the anticipated impacts from construction of the No-Build and Build alternatives. Construction activities would be different depending on the alternative selected. All project alternatives would involve both physical and operational changes to existing ferry terminal facilities and other facilities in the project area. Also, construction activities would sometimes increase congestion on SR 525 during the peak travel periods.

4.1 GENERAL CONSIDERATIONS FOR ALL ALTERNATIVES

4.1.1 Limited Access to the Mukilteo Ferry Terminal

An unavoidable challenge with construction activities for the Mukilteo ferry terminal is the limited access to the site; it can only be accessed from SR 525. Construction access through the Mount Baker Terminal crossing is impossible because the roadway has load limit restrictions, is subject to landslides, is designated as a quiet zone, and would require trucks to use residential streets.

4.1.2 Construction Timing and Activities

WSF policy limits construction activities to the off-peak season unless the construction activity is an emergency or would not affect ferry riders. Although construction activities would have less impact during the off-peak season between September and May, the off-peak season still has substantial demands during evening commute periods. Similar to current conditions, ferry shoulder queuing on SR 525 could extend past Goat Trail Road and passengers could be waiting for over an hour

to board the ferry during construction activities. During long ferry waits, people may exit their vehicles, which exposes them to traffic, including the increased construction-related vehicles, on SR 525. It would be appropriate to examine alternative travel measures that modify when construction vehicle trips occur.

4.1.3 Duration of Construction

The No-Build Alternative would still involve construction activities for the replacement of the Mukilteo ferry terminal's aging infrastructure. The No-Build Alternative construction consists of smaller projects lasting approximately 3 to 6 months over the next 20 years. All of the Build alternatives would remove the existing terminal and construct an improved terminal and supporting facilities with either a different layout (Existing Site Improvements Alternative) or at a new site (Preferred and Elliot Point 1 alternatives). The Existing Site Improvements Alternative would have construction activities lasting 1 to 2 years; the Preferred and Elliot Point 1 alternatives have more construction activities and would last about 3 to 4 years, although major activities would last only about 2 years.

The estimated length of construction could be either longer or shorter depending on design, permit conditions, phasing, and the contractor's construction approach. Construction timing and duration would also depend on the availability of funding and other approvals. Major activities for any of the Build alternatives could begin by 2016, and the terminal would likely begin operation in 2019 or 2020. Site development and site preparation activities, such as property acquisition, demolition, or some utility relocation activities, could occur after the environmental process is complete, which is expected by 2014.

4.1.4 Duration of Mukilteo Ferry Terminal Closure

The duration of the Mukilteo ferry terminal closure, which would divert ferry trips from Mukilteo to Edmonds during construction activities, varies by alternative and is described in *Sections 4.2* through *4.5*. WSF could stage the No-Build Alternative to consolidate closures. While the smaller individual projects would last for 3 to 6 months, consolidating construction under the No-Build Alternative could close the terminal for 3 to 9 months. Construction activities for the Existing Site Improvements Alternative are anticipated to close the terminal for 1 to 2 months. The Preferred and Elliot Point 1 alternatives construction could occur without closure or with a short overnight or weekend closure.

4.2 NO-BUILD ALTERNATIVE

The No-Build Alternative includes what would reasonably be needed to maintain the existing ferry terminal at a functional level. Under this alternative, an improved multimodal transportation facility to meet future demand or operational needs would not be developed. Instead, it assumes that maintenance and structure replacements would occur in accordance with legislative direction to maintain and preserve ferry facilities. There would be no investments to improve the operation, safety, security, or capacity at the terminal.

For this alternative, the construction activities associated with maintenance and structure replacements that would close the terminal are anticipated to last 4 to 9 months. Other construction activities consist of smaller projects lasting approximately 1 to 6 months over the next 20 years and are not expected to result in closure of the Mukilteo ferry terminal.

During initial construction, activities requiring temporary facility closure could be scheduled for weekends and nights to minimize disruptions to ferry users. During the ferry terminal closure, ferry service would be diverted to Edmonds. Passenger-only service could be maintained between Clinton and Mukilteo. Commuters would see an increase in their travel times and, potentially, need to change how they travel during this period.

Because the sailing time between Clinton and Edmonds is approximately 50 minutes compared to the 15-minute sailing time between Clinton and Mukilteo, travel time across Possession Sound would increase by approximately 35 minutes. This increased sailing time also means that fewer ferry trips per day would occur with the current number of ferries serving the routes. Currently, there are 37 ferry trips a day between Mukilteo and Clinton; the number of daily trips would be reduced to approximately 18 trips when sailing between Edmonds and Clinton. With fewer ferry trips, it is likely that more ferries would sail full, increasing the potential wait times for passengers who would need to wait for the next sailing.

In response, people would likely change their travel patterns in the following ways:

- *Driving:* Vehicles would be redirected to Edmonds, which would reduce the amount of traffic on SR 525 in Mukilteo and increase traffic on SR 524 and SR 104 in Edmonds. Cross streets connecting to SR 524 and SR 104 would experience negligible, if any, changes in traffic volumes. However, those streets would nevertheless experience delay because of the increased vehicular traffic on SR 524 and SR 104. Some of the people who previously chose to take their vehicles on the ferry may decide to drive around the north end of Whidbey Island on SR 20 or shift to a walk-on passenger mode because of the increase in ferry wait times.

- *Rail Passengers:* When the Mukilteo-Clinton route is diverted to Edmonds, passengers who continue their trip on the Sounder commuter rail would be able to connect at the Edmonds Station. The Sounder commuter rail would still provide service to Mukilteo.
- *Bus Passengers:* People making a connection between bus transit and the Mukilteo ferry terminal would need to alter their bus route to use existing Community Transit routes. This would require a transfer to complete the connection. People could also use peak Sounder train service to connect from Mukilteo to Edmonds during the AM peak and from Edmonds to Mukilteo during the PM peak. A direct bus shuttle service could also be provided between the two ferry terminals.
- *Park-and-Ride:* People who travel from Mukilteo to Clinton and leave vehicles in parking lots in Mukilteo may not be affected if passenger-only service is maintained between Mukilteo and Clinton. The lack of passenger-only ferry service could cause some people to seek park-and-ride space near the Edmonds ferry terminal.
- *Bicycles:* The distance between the Mukilteo and Edmonds ferry terminals is approximately 14 miles, which is a long commute for bicyclists. Some bicyclists may choose alternative modes of travel.
- *Walk-on Passengers:* The majority of walk-on passengers would experience the effects described for rail, bus, and park-and-ride passengers. The remaining portion of walk-on passengers would need to use another mode of transportation because the distance between the Mukilteo and Edmonds ferry terminals is too far to walk.
- *Trip Avoidance or Disruption:* Some people may elect not to take some ferry trips during this time. These trips would tend to be elective and recreational trips, and not work commute trips; however, work trips could also decrease. Closure during the peak summer season would have more impact on ferry users traveling in vehicles than the fall to spring season.

During the full closure periods, construction truck trips along SR 525 to the Mukilteo ferry terminal would peak for fill, asphalt, and concrete deliveries. These trips would likely be subject to travel restrictions during peak ferry times. This increase in truck traffic is not anticipated to greatly affect roadway operations because of the decrease in ferry vehicle traffic during the terminal closure.

Some of the on-street parking along Front Street closest to SR 525 would be temporarily removed during construction activities.

4.3 PREFERRED ALTERNATIVE

The existing terminal would remain fully functional until the new multimodal facility is ready, then it would be removed. The shift to the new terminal could occur overnight or with a short closure at night or on a weekend. Demolition of the existing facility would cause a short-term increase in truck traffic on SR 525.

The extension of First Street would likely occur late in construction to avoid impacts on the existing facilities. During this 3- to 4-month construction period, all ferry traffic would use Front Street and Park Avenue to access First Street, increasing congestion.

Depending on work phases, construction of the First Street extension could affect access to the Mukilteo Station parking lot.

4.4 EXISTING SITE IMPROVEMENTS ALTERNATIVE

Although various portions of the existing site would need to be reconfigured and the area roadways would be modified, the Mukilteo ferry terminal would continue to operate during the construction of most terminal replacement elements. Construction activities would still require schedule changes, including limited evening or weekend sailings, or weekend closures, but most of the site and facilities could be developed without affecting ferry operations. Full closure would be required for 1 to 2 months to replace the transfer span and other terminal elements. During this time, ferry service would be re-routed to Edmonds with effects similar to those described for the No-Build Alternative.

Some short-duration lane closures could occur; traffic operations would be maintained by a one-way flagger control. Because SR 525 provides the only access over the BNSF tracks, there are no detour options. Construction-related truck traffic would have to use SR 525, primarily related to material deliveries and removal of demolition debris.

Construction activities for the First Street extension would require temporary short-term closures of one or two lanes on SR 525, which would likely occur during non-peak ferry periods. This activity could be phased towards the end of the project to minimize disruption to the regular ferry operations. The First Street extension construction would last 3 to 4 months.

The transit center could be constructed early. Buses could then temporarily use Front Street and Park Avenue to access the relocated bus zones. Some parking along Front Street would be temporarily removed to accommodate the larger turning radius required for buses.

4.5 ELLIOT POINT 1 ALTERNATIVE

This alternative would relocate the ferry terminal to the eastern portion of the Mukilteo Tank Farm, extending to the Port of Everett Mount Baker Terminal. The construction impacts to transportation for the Elliot Point 1 Alternative would be similar to those described for the Preferred Alternative.

5 INDIRECT AND SECONDARY IMPACTS

This chapter describes the indirect and secondary effects expected to be associated with this project. Indirect effects result from one project but, unlike direct effects, typically involve a chain of cause-and-effect relationships that can take time to develop and can occur at a distance from the project site. Induced growth or growth-inducing effects are terms used to mean indirect effects related to changes in land use, population density, or growth rate.

The base land use assumptions used to develop the future travel demand forecasts for this project (using the *WSDOT Ferries Division Final Long-Range Plan* model) are consistent with the GMA plans in Island County and Snohomish County. Therefore, the potential for "induced growth" is largely already incorporated into the forecasts as "planned growth" consistent with GMA plans. Also, because future vehicle volume increases are constrained by vessel capacity and there is a large estimated increase in walk-on passengers compared to vehicles in the future, the potential for any induced vehicle travel would be very small for this project.

6 CUMULATIVE EFFECTS

This chapter explores cumulative effects on transportation. Cumulative effects are the incremental impacts of all effects of the project, including past and present actions in the study area, and the effects of reasonably foreseeable, planned projects in the study area. Most cumulative transportation impacts are already assumed in the future year transportation projections used for the direct impact analysis in *Chapter 3 Transportation Effects*. These impacts include expectations for increased growth in local and regional population and employment, as well as the resulting increases in travel. Some of the other future development actions in the area could result in other impacts that could create different cumulative effects.

6.1 SOUND TRANSIT MUKILTEO STATION

Sound Transit's Mukilteo Station, which is located southeast of the existing ferry terminal, is being developed in phases. A second phase of the project, which will be under construction from mid-2013 to fall 2014, will add a platform on the south side of the tracks, and provide a pedestrian bridge to connect the two platforms.

Sound Transit and the City of Mukilteo are studying potential options for expanding parking, a specific site and layout designs have not yet been determined. More commuter parking for the Mukilteo Station would improve access to commuter rail service, which could increase local vehicle trips during the peak period.

To evaluate cumulative effects associated with parking at Mukilteo Station, the project team considered traffic impacts for expanding parking by up to 130 stalls . Analysts assumed expanding parking would add 75 vehicle trips traveling to the parking area, and 20 vehicle trips leaving the parking area during the PM peak hour. For the No-Build and Build alternatives, the SR 525/Fifth Street intersection is

anticipated to have slightly more delay, but would operate below the City of Mukilteo's acceptable LOS D standard (see *Section 3.4.4*) with or without expanding parking. However, with the proposed mitigation for the SR 525/Fifth Street intersection (see *Section 7.1.3*), it would operate at an acceptable LOS even with the potential increase in vehicular traffic from additional parking.

6.2 NOAA FISHERIES SERVICE MUKILTEO RESEARCH STATION EXPANSION

NOAA Fisheries Service operates a laboratory immediately east of the Mukilteo ferry terminal and plans to upgrade the facility to include public outreach and publication activities. These plans do not appear likely to result in a high number of vehicle trips to the facility beyond future levels already assumed in the traffic analysis in *Chapter 3 Transportation Effects*.

6.3 PORT OF EVERETT MOUNT BAKER TERMINAL

The Preferred Alternative would provide an extension of First Street to slightly more than halfway into the Mukilteo Tank Farm. This extension would form part of a planned permanent public access road needed to connect to the Mount Baker Terminal. The Elliot Point 1 Alternative would extend completely to the Mount Baker Terminal, and the Existing Site Improvements Alternative would not alter access to the tank farm site. Traffic conditions would be similar to those already assumed for the Mukilteo Multimodal Project.

6.4 MUKILTEO TANK FARM LAND TRANSFER AND MOUNT BAKER CROSSING

The transfer of the Mukilteo Tank Farm to the Port of Everett allows the Port to complete access improvements to the site. The Mount Baker crossing is an improved at-grade crossing of the BNSF tracks connecting Mukilteo Lane in the city of Mukilteo to the Mukilteo Tank Farm, including an area that is within the city of Everett. This crossing is currently gated to vehicles to restrict access, but would be open for access to the public shoreline area near the Mount Baker Terminal when the Port has ownership of the tank farm and can complete the final roadway connection.

The City of Mukilteo intends for the Mount Baker crossing to be open to general-purpose traffic, but this could conflict with Elliot Point 1 Alternative operations. Permitting general-purpose traffic to cross at this location would increase volumes at a complicated intersection that controls vehicular traffic entering and exiting the Mukilteo ferry terminal. Moreover, it would increase the number of vehicles traveling through the residential neighborhoods south of the BNSF tracks. Restricting

vehicular traffic traveling to or from the ferry would be difficult. Implementation of this restriction would need to rely on other motorists to report violators and require periodic police presence for enforcement. The Preferred Alternative would support the City's plans without ferry operation conflicts because turn movements could be restricted; the Existing Site Improvements Alternative would not affect the crossing.

6.5 SR 525 BRIDGE

The SR 525 bridge over the BNSF tracks has been evaluated by WSDOT bridge engineers. Its current structural capacity and condition do not warrant rehabilitation or replacement at this time, even though it does not fully meet ADA standards. The City of Mukilteo has expressed an interest in accelerating the replacement of the SR 525 bridge, but its replacement is not currently funded.

Eventually, construction of a new bridge with current ADA design standards could improve the safety and quality of pedestrian travel in the area. In addition, it would complement the other multimodal investments related to the Mukilteo Multimodal Project. Enhanced pedestrian facilities could increase walk trips by residents traveling from downtown to waterfront destinations, but volumes would likely remain similar to those assumed for the project alternatives. Construction of the bridge would likely require closure of SR 525, temporarily affecting access to the waterfront, Mukilteo ferry terminal, and Mukilteo Station.

7 MITIGATION MEASURES

This chapter describes measures that could mitigate the adverse impacts identified in this discipline report.

7.1 INTERSECTIONS PROJECTED TO EXCEED LEVEL OF SERVICE STANDARDS

This section describes potential mitigation actions to improve the operations at intersections that would not meet the City of Mukilteo standards. Most of the delay at study area intersections is due to background growth and not the Mukilteo ferry terminal. Therefore, the proportionate share for mitigating the increase in delay is also small.

7.1.1 SR 525/Front Street Intersection

No-Build and Existing Site Improvements Alternatives

The year 2040 LOS E forecasted for this intersection is for non-ferry traffic, which would experience most of its delay during the ferry loading and unloading process. When ferry traffic is not being loaded or unloaded, this intersection would operate at or better than the LOS D standard. The proportionate share of ferry vehicle traffic growth through this intersection for all 2040 traffic is 12 percent.

To reduce the delay to non-ferry traffic during ferry loading and unloading, the following mitigation actions could be taken:

- *Allow northbound SR 525 vehicles to turn left during ferry loading.* Currently, some vehicles are able to make this turn during the loading process; however, to be conservative in the intersection analysis, it was assumed the northbound left turn was prohibited. Evaluation of vehicle turning radii is needed to ensure there is adequate space for turning movements (two westbound right-turn lanes, one northbound left-turn lane, and an eastbound right-turn lane).
- *Provide additional breaks in the loading and unloading process.* Although this would benefit non-ferry traffic, adding time to the ferry turnaround process (loading and unloading) could cause some ferries to miss their scheduled sailings and passengers to miss their connections to the bus or train. When ferries miss scheduled sailings, the shoulder queuing length on SR 525 would increase and the amount of time ferry passengers wait for their ferry would increase.

Preferred and Elliot Point 1 Alternatives

The SR 525/Front Street intersection is projected to operate at LOS B for these alternatives; therefore, no mitigation is needed.

7.1.2 SR 525/88th Street SW Intersection

The SR 525/88th Street SW intersection is a two-way stop controlled intersection; only traffic on 88th Street SW is required to stop. By 2040, the operating conditions at this intersection are projected to degrade to LOS F for all alternatives because of the projected increase in vehicles passing through this intersection (see *Section 3.4.2*). The vehicle traffic from 88th Street SW represents 3 percent (65 vehicles) of this intersection's volume during the 2040 PM peak hour. The estimated proportion of ferry traffic passing through this intersection is approximately 21 percent, but the growth in traffic from 2010 to 2040 attributed to ferry traffic would be approximately 5 percent.

The following mitigation actions would reduce delay for 88th Street SW movements:

- *Provide left-turn lanes on SR 525 (completed 2011).*
- *Convert lanes to right-turn pockets on 88th Street SW.*
- *Disallow left turns and through movements from 88th Street SW, diverting traffic to the 92nd Street or 84th Street traffic light.* This would improve operations for eastbound and westbound right-turning vehicles from LOS F to LOS C.

7.1.3 SR 525/Fifth Street Intersection

The SR 525/Fifth Street intersection would operate at LOS E during the 2040 PM peak period for all alternatives. Delay for all movements at this intersection would be increased because the northbound ferry and non-ferry traffic movements have

separate signal controls. Because ferry vehicle traffic would queue in the shoulder lane, a red light would stop ferry traffic so northbound right turns could be completed safely. The estimated proportion of ferry vehicle traffic passing through this intersection is approximately 46 percent (see *Section 3.4.2*) in the 2040 PM peak hour, but the growth in traffic from 2010 to 2040 attributed to ferry traffic is approximately 11 percent.

No-Build, Preferred, and Existing Site Improvements Alternatives

To improve the LOS at this intersection, the following mitigation action could be taken:

- *Convert the Fifth Street westbound right-turn-only lane into a shared left-turn/right-turn lane and extend the merge area on SR 525 south of this intersection.* This would provide additional merge space for traffic turning from Fifth Street. This action would improve the intersection operations to LOS D.

Elliot Point 1 Alternative

During the 2040 PM peak period, the modeled vehicle queue from the tollbooths would not extend to SR 525. If ferry and non-ferry traffic combined into the local lane (a shared through/right-turn lane) at the SR 525/Fifth Street intersection, it would operate at LOS C. This improvement would decrease the delay for vehicles turning left from Fifth Street onto southbound SR 525 from LOS F to LOS E; the delay for this movement could be decreased to LOS D or better by constructing a dual left-turn lane from Fifth Street to southbound SR 525.

However, the improvement described above for the other alternatives would likely be needed during the summer months.

7.2 FERRY CROSSING LEVEL OF SERVICE

By 2040, regardless of whether or not the Mukilteo Multimodal Project is implemented, the Mukilteo-Clinton ferry route is projected to be above the Level 1 Standards for likely "boat wait" set by the *WSDOT Ferries Division Final Long-Range Plan* (the level 1 standard measure is when 25 percent to 30 percent of boats sail full). When this occurs, WSDOT would consider operational strategies identified in the *Long-Range Plan* to encourage demand to shift to other modes. The Mukilteo Multimodal Project alternatives, including the Preferred Alternative, already incorporate a number of the recommended strategies, including improved transit and non-motorized facilities.

The *WSDOT Ferries Division Final Long-Range Plan* has identified nine categories of strategies to manage demand:

1. Vehicle Reservation Systems
2. Transit Enhancements
3. Non-motorized Enhancements
4. Optimized Fare Collection Techniques
5. Enhanced User Information
6. Scheduling
7. Traffic and Dock Space Management
8. Promotion and Marketing of Modes not Using Single-Occupant Vehicles
9. Parking and Holding

In their *Long-Range Plan*, WSDOT identified a vehicle reservation system as a primary demand management strategy, which would reduce congestion related to ferry traffic. WSDOT is continuing to look at reservation systems as an element of the demand management programs it is conducting at a system level.

As the route's demand approaches the Long-Range Plan threshold, WSDOT would work with stakeholders to identify specific strategies to manage demand and improve terminal operations.

7.3 TRANSIT

The Preferred and Elliot Point 1 alternatives would relocate the current bus stops at the SR 525/Front Street intersection to a transit center east of Mukilteo Station. This relocation would degrade connections made to Mukilteo Lighthouse Park and businesses along Front Street by increasing the walking distance. Mitigation could include additional bus stops on First Street east of the vehicle holding lane entrance for the Preferred Alternative and near Park Avenue for Elliot Point 1.

Community Transit and Everett Transit buses would be able to use curb lane stops during most times of the day, except during peak afternoon and evening periods when vehicle queues from the tollbooths could block the eastbound bus stop location. This blockage would occur more frequently for the Preferred Alternative. Alternatively, for the Preferred Alternative, bus stops could be placed east of the new tollbooth entrance. These bus stops could be used for all bus trips, including those during the PM peak periods, and could maintain pedestrian connectivity to the waterfront and Mukilteo Lighthouse Park, as well as enhance connectivity to Mukilteo Station.

Future growth in transit demand is anticipated with all alternatives, as is increased congestion on the local and regional transportation system. This could increase the need for additional layover areas for transit vehicles. While this would not be an

impact resulting from the project alternatives, WSDOT could review options to provide additional layover spaces as part of a phased approach, working in collaboration with Community Transit, the City of Mukilteo, and Sound Transit.

Elliot Point 1 Alternative

This alternative could provide layover space for five or six buses along the south side of the bus zone. This mitigation would reduce the width of the parking area travel lane and landscaping area.

7.4 PARKING

This section describes how mitigation measures could reduce the loss of parking capacity near the Mukilteo ferry terminal.

No-Build Alternative

No mitigation is required for this alternative because there is no change in the parking supply.

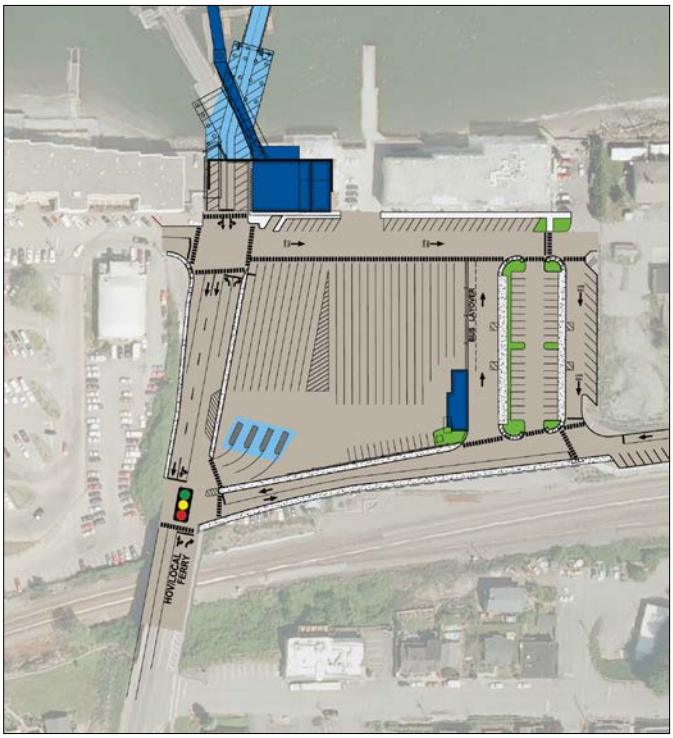
Preferred Alternative

No mitigation is required because the alternative would create additional public parking spaces to replace public spaces that would be removed.

Existing Site Improvements Alternative

The preliminary design for this alternative would result in a loss of 30 on-street parking spaces near the Mukilteo ferry terminal. Mitigation to offset the loss could be difficult due to the lack of available land, but some spaces could be created on First Avenue or as off-street spaces in coordination with the City of Mukilteo. Also, the transit center parking lot could be expanded, which would require WSDOT to manage it (Exhibit 7-1). WSDOT could manage the lot with proof of eligibility for parking, such as signed WSF employee parking spaces with vehicle decals, or public parking through ticketing.

Exhibit 7-1. Design Refinements for Existing Site Improvements Alternative



Elliot Point 1 Alternative

No mitigation is required because the alternative would create additional public parking spaces to replace public spaces that would be removed.

8 CONSTRUCTION MITIGATION

For all alternatives, a construction traffic control plan would mitigate construction impacts. Similar to the plan developed for the Port of Everett Rail/Barge Transfer Facility, the plan could:

- Schedule construction activities to minimize traffic and noise disruptions.
- Schedule major activities such as larger concrete pours or large-volume deliveries to be outside of peak seasonal or peak commute periods.
- Restrict double-length trucks to off-peak periods.
- Manage truck traffic to avoid multiple trucks on local streets such as Front Street and Park Avenue at the same time.
- Construct First Street improvements first and route all construction traffic on First Street.

Mukilteo ferry terminal construction could last up to 2 years, depending on the alternative. The closure of the Mukilteo ferry terminal is anticipated to last approximately 3 to 9 months for the No-Build Alternative, 1 to 2 months for the Existing Site Improvements Alternative, and over a weekend for the Preferred and Elliot Point 1 alternatives. During the closure of the Mukilteo ferry terminal, all ferry-related traffic would be routed to the Edmonds ferry terminal.

8.1 LONG-TERM CLOSURE: NO-BUILD AND EXISTING SITE IMPROVEMENTS ALTERNATIVES

For extended closure of the Mukilteo ferry terminal, WSF could implement the following construction mitigation strategies:

- *Communication and education campaign.* This strategy would alert and educate ferry passengers on how to complete their trip. The campaign should focus on ways to complete a trip without taking a vehicle on the ferry.
- *Signage.* Additional signage on SR 104 beyond the current shoulder queuing lane would be needed to instruct ferry traffic to not block driveways and intersections. Signage elements would also be needed throughout the region (such as I-5) to redirect traffic to Edmonds. Additional signage around the Edmonds ferry terminal would be needed to provide direction for local circulation.
- *Holding lanes and shoulder queuing.* Vehicles and bicycles would need to be reallocated within the Edmonds terminal holding lanes to accommodate both the Edmonds-Kingston and Mukilteo-Clinton routes.
- *Passenger-only service from Clinton to Mukilteo.* During construction it may be feasible to run a passenger-only ferry service from Clinton to Mukilteo to maintain connections to park-and-rides, buses, and rail transit.
- *Bus service from Edmonds to Mukilteo.* Bus or shuttle service from the Edmonds ferry terminal to existing bus routes at the Mukilteo ferry terminal or key destinations would maintain multimodal connectivity during construction.
- *Extended Edmonds ferry terminal shoulder queuing area.* Based on WSF staff experience in March 2011 with the temporary routing of Mukilteo-Clinton ferries to the Edmonds ferry terminal, additional space for queuing and separating vehicle traffic is necessary. Two lanes on SR 104 from Dayton Street south to Paradise Lane could be used to separate vehicle traffic destined to Clinton or Kingston.

For short-term closure of the Mukilteo ferry terminal, WSF would initiate a communication campaign similar to what they have done in the past.

8.2 ADDITIONAL MITIGATION FOR MUKILTEO STATION PARKING IMPACTS

To mitigate the construction impacts of the Preferred and Elliot Point 1 alternatives on access and parking for Mukilteo Station, temporary parking may be needed. WSDOT would coordinate with Sound Transit and the City of Mukilteo to identify additional temporary parking supply and to develop construction staging plans that would minimize impacts on access and parking.

9 REFERENCES

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APPENDIX A

Collision Review

Intersection	PDO	Injury	Fatality	Head On	At Angle	Side Swipe	Rear End	Front End	Object	Other	Ditch / Overturn	Ped / Bike	Daily Volume [a]	Average Annual Collisions (5 Yr Ave)	Average Annual Collision Rate (coll/MEV)
SR 525 / Harbour Pt Blvd	59	30	0	0	13	11	53	2	6	0	0	4	46,725	17.80	1.04
SR 525 / Private Drwy (Key Bank)	4	0	0	0	2	0	1	0	1	0	0	0	32,700	0.80	0.07
SR 525 / Private Drwy (Karmichael)	1	0	0	0	0	1	0	0	0	0	0	0	32,700	0.20	0.02
SR 525 / S Paine	18	5	0	0	2	1	6	0	13	0	1	0	32,700	4.60	0.39
SR 525 / 92nd St SW	10	3	0	0	3	1	7	2	0	0	0	0	32,700	2.60	0.22
SR 525 / 88th St SW	6	2	0	0	5	0	2	0	0	0	1	0	18,675	1.60	0.23
SR 525 / Private Drwy (Marriott)	3	0	0	0	0	0	1	0	2	0	0	0	22,881	0.60	0.07
SR 525 / 84th St SW	27	16	0	2	12	1	21	3	1	0	1	2	27,088	8.60	0.87
SR 525 / Private Drwy (Cascadia)	3	1	0	0	0	0	0	4	0	0	0	0	23,081	0.80	0.09
SR 525 / 81st Pl SW	3	0	0	0	1	0	1	1	0	0	0	0	23,081	0.60	0.07
SR 525 / 80th St	1	0	0	0	1	0	0	0	0	0	0	0	23,081	0.20	0.02
SR 525 / 80th St SW	2	2	0	1	0	0	3	0	0	0	0	0	23,081	0.80	0.09
SR 525 / 76th St SW	5	6	0	0	5	1	4	0	1	0	0	0	19,075	2.20	0.32
SR 525 / Private Drwy (School)	0	1	0	0	0	0	0	0	0	0	1	0	16,644	0.20	0.03
SR 525 / Clover Ln	3	1	0	0	0	0	3	1	0	0	0	0	16,644	0.80	0.13
SR 525 / Private Drwy (Homes)	2	0	0	0	0	0	2	0	0	0	0	0	16,644	0.40	0.07
SR 525 / Horizon Heights Blvd	2	1	0	0	1	0	1	0	1	0	0	0	16,644	0.60	0.10
SR 525 / 15th Pl	1	1	0	0	1	0	0	0	1	0	0	0	16,644	0.40	0.07
SR 525 / Goat Trail Rd	4	3	0	0	3	0	2	0	2	0	0	0	16,644	1.40	0.23
SR 525 / Private Drwy (Unknown)	0	1	0	0	0	0	0	0	0	0	0	1	16,644	0.20	0.03
SR 525 / Church St	1	0	0	0	0	1	0	0	0	0	0	0	16,644	0.20	0.03
SR 525 / 6th St	5	3	0	0	5	0	3	0	0	0	0	0	16,644	1.60	0.26
SR 525 / Private Drwy (Liquor)	7	2	0	0	7	0	2	0	0	0	0	0	16,644	1.80	0.30
SR 525 / 5th St	21	7	0	1	11	1	10	3	1	0	0	1	14,213	5.60	1.08
SR 525 / 4th St	2	0	0	0	2	0	0	0	0	0	0	0	14,213	0.40	0.08
SR 525 / 3rd St	3	1	0	0	3	0	0	1	0	0	0	0	14,213	0.80	0.15
SR 525 / 2nd St	12	0	0	0	7	1	1	3	0	0	0	0	14,213	2.40	0.46
Ferry Toll Booth	2	1	0	0	2	0	1	0	0	0	0	0	14,213	0.60	0.12
W Mukilteo Blvd & Glennwood Ave	3	0	0	0	0	0	3	0	0	0	0	0	16,513	0.60	0.10
Intersection Total	210	87	0	4	86	19	127	20	29	0	4	8			
Intersection Percent	72%	67%	0%	57%	92%	54%	58%	95%	76%	0%	100%	100%			
Road Segment Total	83	43	2	3	7	16	91	1	9	1	0	0			
Road Segment Percent	28%	33%	100%	43%	8%	46%	42%	5%	24%	100%	0%	0%			
Corridor Total	293	130	2	7	93	35	218	21	38	1	4	8	21,089	170	1.33

a Daily volumes at study intersections based on PM peak hour counts and a 0.08 k-factor from the 24-hour count data. Daily volumes at non-study intersections based on adjacent volumes at study intersections.

APPENDIX B

Transportation Methods and Assumptions Technical Memorandum

Washington State Ferries

Mukilteo Multimodal Terminal Project Transportation Methods and Assumptions Technical Memorandum

Prepared for

Washington State Department of Transportation
Washington State Ferries

Consultant Team

Parametrix, Inc.
The Transpo Group

January 2011

Stakeholder Acceptance

The undersigned parties concur with the traffic methods and assumptions for the Mukilteo Multimodal Terminal Project's Transportation Discipline Report (TDR) presented in this document. Any changes to this document will be reflected in an Appendix following the completion of the Final TDR.

WSDOT Urban Planning Office

Signature

Date

WSDOT Northwest Region

Signature

Date

WSDOT Washington State Ferries

Signature

Date

Community Transit

Signature

Date

City of Mukilteo

Signature

Date

Everett Transit

Signature

Date

City of Everett

Signature

Date

Island Transit

Signature

Date

City of Edmonds

Signature

Date

Sound Transit

Signature

Date

Port of Everett

Signature

Date

Island County MPO/RTPO

Signature

Date

Environmental Protection Agency

Signature

Date

National Oceanic and Atmospheric Administration

Signature

Date

United States Air Force

Signature

Date

Puget Sound Regional Council

Signature

Date

Table of Contents

List of Exhibits

Acronyms and Abbreviations

DEIS	draft environmental impact statement
EIS	environmental impact statement
GP	general purpose
HCM	Highway Capacity Manual
HOV	high-occupancy vehicle
HV	heavy vehicle
LOS	level of service
MOE	measure of effectiveness
MUTCD	Manual on Uniform Traffic Control Devices
PHF	peak-hour factor
SEPA	State Environmental Policy Act
SR	State Route
TDR	Transportation Discipline Report
v/c	volume/capacity
WSDOT	Washington State Department of Transportation
WSF	Washington State Ferries

1 Introduction and Project Description

This technical memorandum outlines the methods and assumptions to be used to develop the Transportation Discipline Report (TDR) for the Mukilteo Multimodal Terminal Project. This includes concurrence on the analysis years, the limits of the study, travel demand forecasting and modeling methodologies, safety analysis methods, and operational analysis parameters and methods.

In 2004, the Washington Department of Transportation (WSDOT) began the Mukilteo Multimodal Project Environmental Impact Statement (EIS) with the purpose of improving the transportation service provided by the Mukilteo Ferry Terminal and its operations in providing safe, reliable and effective service for general purpose transportation, transit, high occupancy vehicles (HOV), pedestrians, and bicyclists.

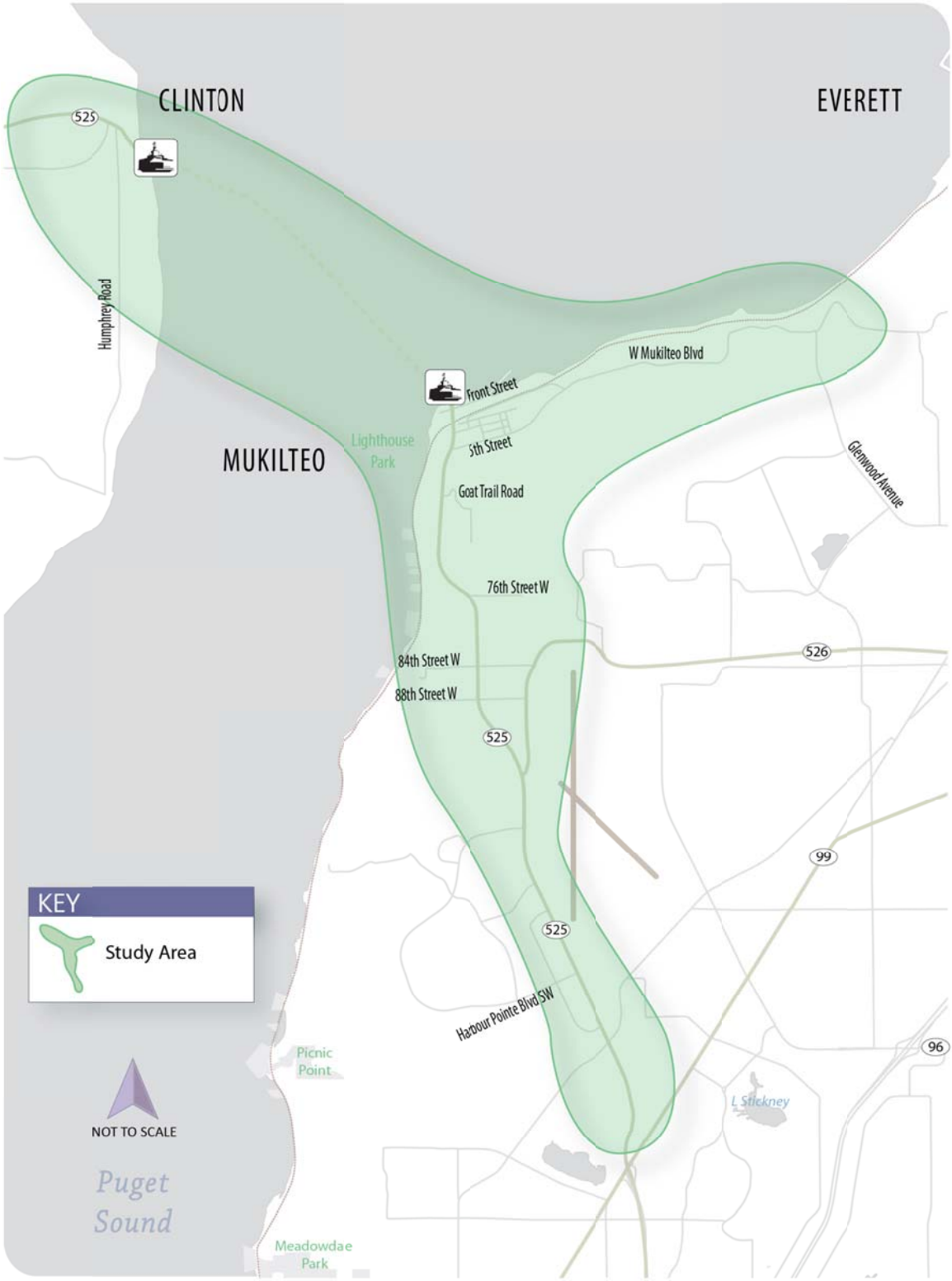
The Mukilteo/Clinton ferry route is part of State Route (SR) 525, the major transportation corridor connecting Whidbey Island to the Seattle-Everett metropolitan area. It is Washington State Ferries (WSF) second busiest route for vehicle traffic and has the third largest annual ridership in the WSF system. The existing Mukilteo ferry terminal is aging and needs major repairs to improve safety, reliability and multimodal connections.

The EIS is intended to satisfy the requirements of the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA). As part of the Mukilteo Multimodal Project EIS, WSDOT is conducting a transportation analysis that will assess and evaluate each alternative studied in the EIS and be included as the Transportation Discipline Report (TDR).

The limits for this project include the Clinton and Mukilteo ferry terminals and a portion of SR 525 extending south from the Mukilteo terminal (see Exhibit 1). For Mukilteo, the transportation analysis includes the existing ferry terminal location or sites defined in the EIS for potential future ferry terminal locations. The study area for the TDR includes the immediate vicinity around these sites, which includes parking lot facilities, ferry queue storage areas, roadways used to access the terminals, and the connections to transit, as appropriate for each site. For Clinton, the analysis includes a parking area usage survey and analysis of ridership, including walk-on arrival and departure multi-modal connections.

The Mukilteo Multimodal Terminal TDR will provide supporting documentation for the Draft EIS (DEIS), which is being prepared for the overall project and is expected to be completed by the summer of 2011.

Exhibit 1. Mukilteo Multimodal Terminal Project Study Area



1.1 Description of the Proposed Action

The Mukilteo Multimodal Terminal Project will improve ferry operations, including the efficiency of vehicle and walk-on passenger loading and unloading, improve safety for passengers, and offer better and safer access for pedestrians and bicycles as well as convenient transit connections.

The focus of this TDR will be on the transportation connections supporting the Mukilteo Ferry Terminal location and the impact of ferry related traffic on the street system. Also included in the TDR will be a summary of mitigation measures for improving bicycle, pedestrian, transit, freight, and general purpose (GP) auto traffic as appropriate.

2 Data Collection

2.1 Turning Movement Counts

On November 17 and 18, 2010 turning movement counts were collected at the following locations from 6:30 AM to 9:00 AM and 3:30 PM to 6:30 PM:

- SR 525/Harbour Pointe Boulevard Southwest;
- SR 525/88th Street Southwest; and,
- SR 525/5th Street.

On January 19 and 20, 2011, turning movement counts were collected at the following locations from 6:00 AM to 9:00 AM and 2:30 PM to 6:30 PM:

- SR 525/84th Street SW/SR 526;
- SR 525/76th Street SW;
- SR 525/Goat Trail Road; and,
- SR 525/Front Street.

Turning movement counts were collected while school was in session and between 6:30 AM and 9:30 AM and 3:30 PM and 6:30 PM.

2.2 Daily Traffic Counts

Daily traffic counts (also referred to as tube counts) were collected at the following locations, for all approaches, at the following locations from November 7, 2010 through November 13, 2010.

- SR 525/Harbour Pointe Boulevard Southwest;
- SR 525/88th Street Southwest; and,
- SR 525/5th Street.

Daily traffic counts were also collected from January 18, 2011 through January 25, 2011 at the following locations:

- SR 525/Goat Trail Road;
- SR 525 south of 76th Street SW and north of Island View Lane; and,
- SR 525 north of Harbour Pointe Boulevard and south of Paine Field Boulevard/Harbour Place.

Annual traffic conditions on SR 525 and at the Mukilteo and Clinton terminal will be described based on available data.

The daily traffic volume counts provide information for all 7 days of the week including Friday, Saturday, and Sunday, for 24 hours. This information allows

comparisons by time of day and day of week to determine the time periods when traffic volumes are the highest.

2.3 Roadway Characteristics

Roadway geometric data and speed limits will be collected via site visit and available online aerial imagery. Collision data and existing signal timing plans will be obtained from WSDOT.

2.4 Parking Data Collection

On November 10, 2010 and December 15, 2010 parking studies were conducted, using either tube counters or field verification of parking stall use, for formal parking lots serving the ferry terminals at the following locations:

- Clinton: Lot between Humphrey Road and SR 525, north of Berg Road;
- Mukilteo: Lot south of Front Street and west of SR 525 (behind Diamond Knot Brewery); and,
- Mukilteo: Lot south of 2nd Street and east of SR 525 (across from Arnie's Restaurant)
- Mukilteo: Lot south of 1st Street and south of the ferry terminal holding area.

2.5 Non-Motorized Data Collection at Ferry Terminals

Non-motorized data was collected on November 17, 2010 at the Mukilteo Ferry Terminal and November 18, 2010 at the Clinton Ferry Terminal. Data collection included the number of people traveling between key destinations, such as the bus stops, Sounder Station, park and ride lots, and the ferry terminal. Data was collected for a 3 hour peak period in the morning and evening.

2.6 Public Transportation

Transit route ridership, schedule (current and estimated changes), and route performance data was requested from Community Transit, Everett Transit, Island Transit, and Sound Transit.

Data regarding Ferry terminal operations were provided by WSF and included Mukilteo to Clinton passenger ridership, and details regarding ticketing and holding area operations.

3 Travel Forecasts/Traffic Operations Analysis

The TDR study area includes existing and proposed ferry terminal sites in Clinton and Mukilteo. Traffic forecasts, non-motorized connectivity, and transit and roadway operations analysis reported in the TDR will focus on the impacts of changes to cross sound ferry ridership, mode choice, and connections to transit services.

3.1 Existing Traffic Volume Standardization

The existing year for the analysis will be 2010. Because traffic counts used for the analysis were collected in different months, a factor is applied to ensure the volumes are comparative for use in the operational analysis. This adjustment is based on annual traffic volumes for each month to determine a seasonal adjustment factor and is provided by WSDOT Transportation Data Office in the State Route Assignment of Factors Traffic Data Matrix. This matrix compiled August 08, 2008, shows an SR 525 November volume adjustment of 0.99 and a January factor of 1.04. Traffic volumes from November will be increased by 107.6 percent and 113.0 percent for January to match May counts—this is the average ferry ridership month (calculated from the difference between the November and July factors).

The all-day traffic counts will be used to evaluate the peak hour traffic volumes, which will capture the school, ferry, and work trip peaks using SR 525 and the ferry terminal area. Annual ferry ridership data will be shown to demonstrate the variation in walk-on and drive-on traffic.

3.2 Travel Demand Model Assumptions and Forecasts

The travel forecasts will be developed for a 2040 horizon year, consistent with the Puget Sound Regional Council (PSRC) Transportation 2040. The Washington State Ferries (WSF) travel demand model will be used to forecast local and regional travel forecasts on the highways and arterials, and transit networks surrounding the existing and proposed ferry terminal locations. The WSF model will also be used to develop and refine estimates of future ferry ridership, including both vehicle and walk-on passengers at the terminal.

The 2040 year was chosen to keep the Mukilteo Multimodal Project consistent with now adopted regional forecasting efforts. In 2010, the PSRC adopted "Transportation 2040" as the update to their long range regional transportation plan. Consequently, most jurisdictions are using 2040 as the horizon year in updates to their comprehensive plans. In addition, many transportation infrastructure projects use a future analysis year at least 20 years beyond its estimated year of opening for environmental review documents--in this case 2016. This would suggest a 2036 future analysis year

or later. For these reasons, the TDR will consider transportation conditions in 2040 as the future analysis year for this project.

A key component of the travel forecasts will be to identify how the walk-on ridership estimates at the proposed ferry terminal locations connect with transit services (including bus and rail), parking, carpooling, and pick-up/drop-off activity. The travel forecasts will be developed for the PM peak period (and hour) ferry ridership and PM peak hour roadway volumes for each of the alternatives. Conversion factors, developed as part of the WSF long-range plan, will be used to estimate daily ridership projections. Seasonal factors will also be applied to adjust forecasts to an average ridership month (May).

Because the WSF model assumes a highly constrained vehicle capacity on the vessels (an increase from the existing 124 average car capacity vessels to 144 average car capacity vessels in the future) with no increase in the number of sailings per day, there is little to no potential for induced growth beyond the planned growth already assumed in the model. Also, the new 144 average car vessels will have essentially the same passenger (non-vehicle) capacity as the current 124 average car vessels, which is estimated at approximately 1,000 people. The WSF Long Range Plan assumes high growth for walk-on ferry passengers in the future (73 percent to 2030) based on the land use forecasts. Therefore, because of the amount of walk-on passenger growth already assumed in the WSF model and the highly constrained vehicle capacity of the vessels, there is little to no potential for additional induced growth to occur through the EIS analysis horizon of 2040.

Ferry ridership demand will be developed for the PM peak periods. Traffic volumes for the roadway operations analysis will be developed for the PM peak hour for the years 2010 and 2040 (because the model is a PM peak only model). The derived growth rate from 2010 to 2040 for the PM peak hour will be applied to the traffic volumes for 2010.

3.3 Model Overview

The WSF model was selected as the preferred model because it has been recently updated to support development of the WSF long-range plan (2009-2030). It uses incremental choice methods and a two-staged forecasting analysis procedure that relies on actual ferry travel patterns and survey-based estimation of parameters such as travel time and cost elasticities. The model includes all transit networks and specifically focuses on the intermodal connections at both the Clinton and Mukilteo ferry terminals.

The WSF model is largely consistent with the PSRC model except that it has several additional features and was expanded geographically to capture most of the WSF "travel shed" outside of the four-county PSRC region. The additional features are primarily focused on modeling intermodal connections at the ferry terminals and sub choice incremental models for determining

walk-ons and auto boardings. The model network stretches from Olympia to Vancouver, BC and the Olympic Peninsula to the Cascade Mountains.

The model was calibrated to a 2006 base year and estimates 2030 travel conditions. Because the WSF model only provides forecasts to 2030, a growth factor will be applied to the 2030 forecasts to develop 2040 forecasts. The growth factor will be based on land use and travel forecasts from the most recent version of the 2040 PSRC model (using the constrained transportation project list) and the State Office of Financial Management.

3.4 Preparation of 2040 No Build Forecasts

The future year 2030 No Build model network and land use assumptions shall remain consistent with the most recent version of the WSF 2030 model. The 2030 No Build model (WSF model) shall assume the existing ferry terminal remains unchanged, but include assumptions related to expanded vessel capacity. The development of the travel forecasts will be conducted in two distinct stages. The first stage will develop the 2040 ridership forecasts at the terminal and the associated mode of access and egress. The second stage will focus on the highway and arterial volume forecasts at the study intersections. Exhibit 2 illustrates the process described below in Stage 1 and Stage 2. Planned roadway projects will be identified from the PSRC Transportation 2040 demand model. Projected transit growth and transit system capacity and scheduling changes will be identified in coordination with Community Transit, Everett Transit, and Sound Transit.

3.4.1 Stage 1 – Ferry Ridership Forecast

The WSF model includes 28 travel districts that represent major origin-destination patterns from the results of the 2006 WSF travel survey. Growth factors shall be developed for each of the 28 travel districts within the model. The districts that are comprised within the 2040 PSRC model will be evaluated first to identify the land use growth rates between 2030 and 2040. For those districts not included in the PSRC model and which comprise travel patterns that use the Mukilteo ferry (primarily Whidbey Island), population and employment data from the State Office of Financial Management will be used to identify an appropriate growth rate between 2030 and 2040. The calculated growth rates will be applied to the specific origins and destinations that use the Mukilteo ferry based on the 28 districts.

Once the growth in PM peak period passenger ridership for the Mukilteo route is determined, the mode of access and egress percentages to and from the ferry terminals at Mukilteo and Clinton will be estimated. The modes of access and egress consist of auto-driver, auto-passenger, bus, rail, park & ride, drop-off/pick-up, bicycle, or walk. When district to district passenger ridership growth is applied to each of the 2030 modes of access and egress this assumes a constant market share. The 2030 model forecasts assumed specific trends in

the type of modal access and egress based on vehicle capacity limits of the ferry, availability of transit connections, and costs. The trends regarding the shift in the share of walk-on and the other various modal connections will be extrapolated to 2040. In other words, the trends will be assumed to continue beyond 2030. For example, if the growth in walk-on is trending towards rail, that trend will be assumed to continue at the same rate between the years of 2030 and 2040, unless there is a known capacity constraint.

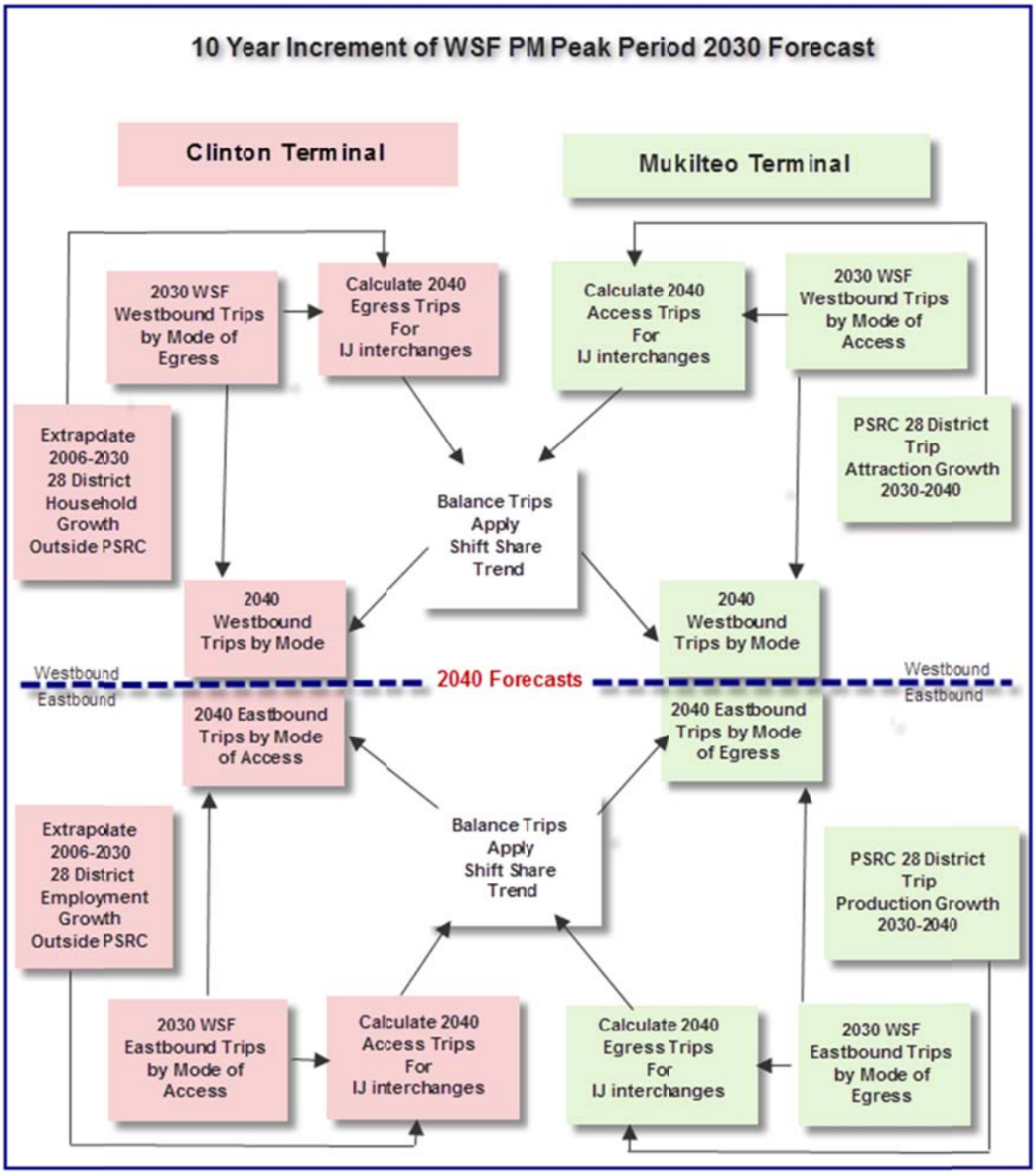
3.4.2 Stage 2 - Roadway Forecasts

Once the ridership forecasts have been established, growth rates between 2030 and 2040 for the highways and arterials in proximity to the Mukilteo terminal will be developed using the PSRC model. These growth rates will be applied to the WSF model forecasts for the same locations to determine 2040 highway and arterial traffic volumes during the PM peak hour.

3.5 Preparation of 2040 Build Forecasts

The 2030 No Build (WSF) model will be used as a starting point to develop ridership forecasts for the Build alternatives. The Build alternatives will represent improvements or relocation of the existing Mukilteo terminal. Depending on the alternative, the improvements would likely be at a scale that is too microscopic for a travel demand model to account for appropriately. To better reflect possible changes to the travel forecasts based on terminal design considerations, the forecasts will be adjusted manually to account for terminal design details that could impact overall travel demand and mode share. It is not expected that the ridership forecasts will change.

Exhibit 2. 10-Year Increment of WSF PM Demand Model



3.6 Post-Processing Routine

The model volumes developed from the 2040 No Build and Build forecasts shall be post-processed and translated into PM peak hour vehicle and person volumes for use in the long-range transportation analysis for each of the Build alternatives. Growth factors between existing conditions model output and the 2040 No Build and Build forecasts shall be applied to existing field-collected counts to arrive at appropriate 2040 volume projections. The vehicle and person volume forecasts shall be further documented in the TDR Report.

3.7 Ferry Terminal Operations Analysis

The ferry terminal operations analysis for this TDR will utilize the VISSIM Version 5.2 micro-simulation tool. The model development and calibration process is briefly described below and will also be documented in the methodology section of the Mukilteo Ferry Terminal TDR. This documentation will also be included as an appendix to the TDR.

The model will be calibrated for a one-hour peak time period occurring between 3:00 PM to 6:00 PM to the following measures of effectiveness (MOEs):

- General purpose vehicle and transit volume throughputs match count data across a one-hour peak period at screenline locations within 10 percent;
- Pedestrian dispersion to the transit network and street system is comparable to field data collected; and
- Visually-acceptable congestion and queuing was used at ramp terminals compared to the field study.

The calibrated existing conditions model will be converted into a design year 2040 model by applying the following changes:

- Include planned and programmed projects in the No Build and Build models.
- Code project conditions according to the best available plans. Driver behavior and link characteristics may be revised per the design improvements of local street systems.
- Update traffic volumes and bus service per design year.

The following MOEs will be used to provide a comparison between existing conditions, and the No Build and Build alternatives for year 2040:

- Average vehicle delays (seconds per vehicle) and intersection level-of-service (LOS) equivalents for the peak hour;
- Walk time (between transit and the terminal in minutes);
- System delay during ferry loading/unloading (minutes);
- Queues (feet); and,
- Travel times (seconds or minutes).

Transit layover space at the ferry terminal will be evaluated based on existing route schedules and additional information provided by the transit agencies serving the Mukilteo and Clinton ferry terminals.

The implementation of a reservation system at the Mukilteo and Clinton terminals will be discussed in the TDR.

3.8 Non-Motorized Analysis

A non-motorized analysis will evaluate access, circulation, and safety for pedestrians and bicyclists, and the quality of connections to transit or other surrounding destinations for each of the alternatives. Other surrounding destinations studies include park-and-ride, kiss-and-ride, bus transit, rail transit, and general dispersion into neighborhoods and business areas. Walk-on passenger surveys will be used to evaluate future mode share and assess the impacts of each alternative on access, circulation, and safety for pedestrians and bicyclists. Major pedestrian and bicycle travel patterns, and their associated destinations or origins adjacent to the ferry terminal will be identified as part of the data collection effort. The origins and destinations of the walk-on passengers will be summarized by the percentage that connect to rail, bus, parking, pick-up/drop-off, bike, or walking.

The following MOEs will be used to evaluate and compare between existing conditions and the No Build and Build alternatives for year 2040:

- How well they accommodate inter-modal transfer with local bus and commuter rail (total distance and wait time for signals);
- Differences in walking and bicycling travel times to major origin-destination points (minutes);
- How well they reduce conflicts between pedestrians/bicyclists and motorized vehicles within the study area (number of at-grade conflict points and pedestrian/vehicle volumes at each location); and,
- Identification of gaps in the non-motorized transportation system will be highlighted and projects to mitigate these identified gaps will be identified.

3.9 Surface Street Intersection Operations Analysis

The surface street intersection operations analysis will include the following intersections:

- SR 525/Harbour Pointe Boulevard Southwest;
- SR 525/88th Street Southwest;
- SR 525/84th Street Southwest/SR 526;
- SR 525/76th Street Southwest;
- SR 525/5th Street;
- SR 525/Front Street; and
- West Mukilteo Boulevard/Glenwood Avenue.

The surface street intersections will be analyzed with the Highway Capacity Manual (HCM) methodology using the Synchro 7 software application developed by Trafficware.

Results will be summarized into tables. For signalized intersections, average intersection delay, intersection LOS, and intersection volume/capacity (v/c) ratio will be used as MOEs. For all-way, stop-controlled, unsignalized intersections, average intersection delay and intersection LOS will be used as MOEs. For stop-controlled, unsignalized intersections with one or more free-flowing approaches (such as two-way, stop-controlled intersections), average intersection delay as well as worst approach LOS, average delay, and v/c ratio will be used as MOEs. Intersections with LOS F will be identified as not meeting the City of Mukilteo's concurrency standard, which adopted a LOS of E or better as acceptable delay on major arterials, minor arterials, and intersections.

The model will be used to evaluate the one-hour peak period occurring between 6:00-9:00 AM and 3:00-6:00 PM (based on available counts). For all intersections, the 95th percentile queues will be tabulated to compare the length of queue to the available storage. Results will be taken from Synchro Highway Capacity Manual (HCM) reports and based upon recent aerial imagery of study area intersections.

Existing conditions analysis will be based on traffic volumes collected the week of November 8, 2010 on the Tuesday, Wednesday, and/or Thursday. Traffic volumes collected in July 2010 will be factored based on the annualized ridership of the Clinton-Mukilteo Ferry route. Additional Synchro volume input assumptions include:

- Pedestrian volumes from the counts will be used where available. Where unavailable, pedestrian volumes will be estimated based on adjacent intersections;
- Future condition pedestrian volume counts will be based on cross sound ridership estimations in the vicinity of the ferry terminals;
- Heavy vehicle (HV) percentages will be used from the turning movement counts. Where unavailable, a HV percentage of 2 percent will be assumed as this is the standard default used in the industry; and,
- An intersection peak-hour factor (PHF) is a factor that adjusts the peak hour volumes to reflect the peak 15 minutes within the hour. A PHF of 0.95 will be used as a default for the design year analysis with an existing PHF of 0.90 or greater. For intersections with an existing PHF lower than 0.90, the design year analysis will increase the existing PHF by 0.05.

Signal operations will be coded from information supplied by jurisdictions maintaining the signals. If information is unavailable, signal operations will be

coded based on field visits, optimized signal timings from Synchro, and/or standard inputs from the Manual on Uniform Traffic Control Devices (MUTCD) and HCM. For the future conditions analysis, it is assumed that the signal networks will be optimized for future volumes.

4 Collision Analysis

WSDOT's collision data for the study area intersections will be reviewed for a recent five-year period. An analysis will be conducted to identify historical trends and to determine where the highest concentration of collisions have occurred. This will include possible contributing factors and how the project may impact those factors. It will also include a review of collision types, severity, rates, and factors contributing to the safety trends. The potential effects of the project on safety trends will be described for the 2040 design year.